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Rogue National Wild and Scenic River Hellgate Recreation Section

Hazardous Fuel Reduction Project

Affected Environment and Environmental Consequences

Supporting Analysis & Documentation

ROGUE RIVER HAZARDOUS FUEL REDUCTION PROJECT
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4.1. Introduction

This document discusses the environmental changes BLM resource specialists expect would arise from implementation of the proposed action and alternatives. Discussions focus primarily on the planning and analyses issues identified through the scoping process (See EA p. 13). The analysis documented herein provided the basis for the summary and findings of environmental effects included in the project's environmental assessment (EA Section 4.0). In evaluating the effects, the assumption is made that the proposed actions will be implemented to their full potential and extent and that all appropriate Project Design Features (PDFs) will be implemented as a part of each neighborhood plan. (Neighborhoods may actually choose less intensive treatments.)

If an environmental component is not discussed, it is because the resource specialists have not identified a substantive or potentially significant impact and that the impacts are within the scope of the analysis considered in the Medford District Resource Management Plan's (RMP) Environmental Impact Statement to which this EA is tiered. The tiered documents and other references provide the reader with descriptions of the general or "typical" affects projects similar in nature to the proposed vegetation / fuel hazard reduction treatments would produce.

Project analyses have not identified any impacts or potentially significant impacts to areas of critical environmental concern (ACEC); Native American religious concerns; prime or unique farmlands; floodplains; wilderness or wilderness study areas; wetlands or riparian zones; issues of environmental justice; or on energy development, production, supply or distribution. The project is not located within the Oregon State Coastal Management Zone (CMZ) nor has it been identified by the State of Oregon's LCDC as a project (by type and geographic location) outside of the CMZ that would need a consistency review.

To set the project in context, Tables 4-1 and 4-2 summarize the project area acreages and the estimated potential acreages of the proposed treatments.

Table 4-1: Project Area Parameters (Acreage)
(GIS determined unless otherwise noted)

Project Area Feature	Total Acres	Terrestrial acres
Rogue-Recreation 5th field watershed *	93,316	
Project Area Boundary (*includes the river*)	8,657	
Rogue River	925	
Home Ignition Zone (*Not able to map, acres estimated*)	500	500
Defense Zone *(includes embedded home ignition zones)*		
Communities-at-Risk (CAR)	3,853	2982
Outside of CARs / WUI	1,523	1,238
Wildland Urban Interface (WUI) outside of CAR	57	55
Threat Zone	2,567	2,088
General Forest zone (non-interface)	657	536
Recreation Sites		620

Rogue River – the river itself	925	
Riparian Reserves: 50’ No treatment buffers		1,040
Riparian Reserves: 150 – 300’ Riparian Reserve		4,270
Approximate potential treatment area		
Potential slashbuster		1,257
Non-slashbuster treatment acres		6,475
Seen Areas (Visual Resource Mgt.)		7,170
Seldom Seen Areas (Visual Resource Mgt.)		1,487

Table 4-2: Potential Treatment Acre Summary

Proposed Treatment	Alt 2	Alt 3	Alt 4
General Fuels Treatments	3,320	4,189	4,189
Broadcast or Underburning	1,326	1,702	1,702
Slashbuster	1,257	1,257	1,257

4.2 Resource: Fire and Fuels

4.2.1. Affected Environment

4.2.1.a Fire Regimes and Fire Condition Class

The historic fire regime in the project area was primarily one of low to mixed severity with frequent fires of low intensity. Fire frequency in the watershed below 3,500 feet is estimated to have been 7-20 years. Low severity fires kept sites more open and less likely to burn intensely even under severe fire weather conditions. Periodic large stand destroying fires would also have occurred.

Fire condition classes provide a coarse scale assessment of how far an area is from its historic / natural fire regime. Table 4-3 summarizes fire condition class acreages in the project area (Maps 10A and 10B). The high percentage of Condition Class 3 reflects the many years of fire exclusion and vegetation / fuel buildup. These conditions can produce intense and severe wildfires. Increases in both the vertical (ladder fuels) and horizontal continuity (dead and down material) are primary contributors to this and affect suppression efforts.

Table 4-3: Fire Condition Classes for Rogue River Corridor

Condition Class	Acres *	Percent
Condition Class 1	1,400	18%
Condition Class 2	2,177	28%
Condition Class 3	4,155	54%
Total	7,732	

Source: BLM OI fuel model and ladder fuels field inventory / Watershed analysis data .
* River acres are not included (See Table 3.1).

4.2.1.b Fuel Hazard, Risk, Values at Risk and Priority Treatment Areas

The current extent of different fire hazard, risk, and values at risk levels are summarized in Table 4-4. (See Attachment for description and derivation. Also Maps 7A&B to 9A&B).

Table 4-4: Hazard, Risk, & Value at Risk Classification

Element	Total Acres	High		Moderate		Low	
		Acres	% of Total Acres	Acres	% of Total Acres	Acres	% of Total Acres
Hazard	7,732	5,354	69%	2,250	29%	128	2%
Risk	7,732	7,395	96%	255	3%	82	1%
Values at Risk	7,732	5,820	75%	1,043	14%	869	11%

Source: Derived from Rogue-Recreation Watershed Analysis (USDI 1999).

Fuel hazard reflects a wildfire's ability to spread and its ease of suppression. It is quantified based on weighted values of ladder fuel presence, fuel model, slope, position on slope, and aspect. The extensive high hazard condition reflects the history of fire exclusion and the resultant build up of ladder fuels, dense stands, and surface fuel loads. Low hazard conditions are primarily found in agricultural fields in the southern part of the Dunn Reach. Low hazard levels on non-BLM lands reflect fuel treatments that have occurred around developments.

Canopy base height and canopy bulk density are parameters not included in the above hazard ratings, but are important components of overall fire hazard. These parameters can be changed with vegetation / fuel treatments. Current ranges of these parameters are shown in Table 4-5. From a fire condition class perspective, desirable canopy bulk densities are 0.0062 to 0.0023 lbs/ft^3 or less, with canopy base heights of 6-14+'. Based upon the fire hazard rating, the canopy base height and canopy bulk density conditions, the potential for a large fire to occur is high to extremely high for the project area.

Table 4-5: Range of Canopy Bulk Density and Canopy Base Height			
	Fuel Model 10	Fuel Model 8	Fuel Model 6
Canopy Bulk Density (lbs/ft3)	0.1819 - 0.2829	0.1111 - 0.2829	0 - 0.1111
Canopy Base Height (ft)	6 - 14.9 (max of 58)	1.0 - 14	0 - 14

* Source: Multi-Resolution Land Characteristics and Western Oregon Digital Imagery Project satellite data acquired for FARSITE fire behavior modeling.

Fire risk in the project area is high due to residential development and recreational use levels and a consequent potential for human-caused fires. Lightning adds to the risk and has resulted in the largest acreage burned. Lightning occurrence is moderate to high, as the area typically experiences at least one lightning storm event every 2 – 3 summers with multiple wildfires resulting. **Fire occurrence** in the Rogue - Recreation watershed for the last 32 years is summarized in Table 4-6.

Table 4-6: Historic Fire Occurrence 1970-2002						
	Total Number of Fires	Percentage of Fires	Yearly Average Number of Fires	Total Acres	Average Fire Size (acres)	Yearly Average Fire Size (acres)
Human Caused	273	54%	9	364	1.3	11
Lightning Caused	203	40%	6	26,356	130	824
Unknown	32	6%	1	0	0	0
Total	508		16	26,720	53	835

Values at risk reflect the property, resource and human values in an area. A majority (75%) of the project area is in the high values at risk category, reflecting the residential, wildlife, recreational, and other forest resource values along the river. Forty-five percent of the project area falls within a designated CAR (Galice, Merlin, and Wilderville/Wonder) and there are additional non-designated wildland/urban interface areas (Alameda Park, Rand, Morrison's Lodge, and Indian Mary Park).

Priority treatment areas are identified based on a combination of hazard, risk, and values at risk. Based on the work done in conjunction with the BLM's preparation of the Rogue - Recreation Watershed Analysis, forty percent of the project area has a high rating for all three factors. Table 4-7 summarizes acreages where hazard, risk, and values at risk ratings are all high.

Table 4-7: Priority Treatment Areas			
Ownership	Acres *	High Ratings in All Three Categories Hazard, Risk, Values at Risk	
		Acres	% of Ownership Total
BLM	5,091	2,520	50%
Non-BLM	3,566	965	27%
All Ownerships	8,657	3,485	40%

* Project area acreage including the Rogue River itself

Source: Derived from Rogue-Recreation Watershed Analysis (USDI 1999).

4.2.2 Environmental Consequences

4.2.2(1) Alternative 1 - No Action

4.2.2(1).a Hazard, Risk, Values at Risk and Priority Treatment Areas

Alternative 1 would see the continuation of the current fire exclusion, rapid wildfire suppression with a "smallest possible size" (94% less than 10 acres) objective, and minimal fuel reduction treatments largely limited to around structures.

Fuel hazard would remain high as vegetation and fuel conditions would continue to develop on current successional trajectories. Resultant conditions have a high potential to support large severe wildfires.

Increases in both the vertical (ladder fuels) and horizontal (dead and down material) fuel profiles would continue. Crown fire potential would continue to increase. Stand destroying wildfire potential would remain high. Table 4-8 projects the fuel hazard levels in the project area.

Table 4-8: Hazard Classification *

Time period	Total Acres **	High Hazard		Moderate Hazard		Low Hazard	
		Acres	% of Total	Acres	% of Total	Acres	% of Total
Current	7,732	5,354	69%	2,250	29%	128	2%
5-10 Years	7,732	5,804	75%	1,826	24%	102	1%
10-20 Years	7,732	6,534	85%	1,136	1,5%	61	1%

Projections are based on the assumption of 20% acreage increase in the high hazard for the first 5-10 years and an additional 40% for the next 10 – 20 years.
** Total Acres – excludes 925 acres of the Rogue River.
* Source: Rogue – Recreation Watershed Analysis (USDI 1999).

As the extent of high fuel hazard and fire condition class 3 increases, the potential for large wildland fires increases. Meeting initial attack suppression goals (to =10 acres fire size) would become progressively more difficult. The potential for a fire to develop into a large fire would continue to increase. Such fires (those >100 acres) typically result in a mix of burn severities: 60-70% unburned to low severity and 30 - 40% moderate to high severity. Upwards of 50% of the burned area might have 75 - 100% canopy mortality.

A hypothetical mid-July fire was modeled using FARSITE. It was "started" on the north side of the Rogue River across from Galice and Carpenters Island, an area with limited access for fire suppression resources. Based on fuel, topography, and representative weather inputs, the modeled fire was 50 acres within 3½ hours and had spotted across the Rogue River. At 12 hours, it was 340 acres, at 24 hours it was 840 acres and after 2½ days, it was projected to be 6,685 acres.

4.2.2(2,3,4) Alternatives 2, 3 (Proposed Action), and 4

From a suppression and minimal stand damage perspective, optimum fuel conditions are those that would result in =4' flame lengths (Agee et al. 2000), that have canopy base height of 6 – 14+' (Agee et al. 2000), that have a canopy bulk density of 0.0062 to 0.0023 lbs/ft^3 or lower (Agee 1996; Carlton 2001), and where there are fire resistant species of large trees 20+?DBH (Agee 2002). Table 3-9 presents the generalized effects of surface fuel, canopy base height, canopy bulk density treatments, and retention of larger fire resistant trees. Table 3-10 provides a generalized summary of effects for the alternatives based on the 4 parameters.

Table 4-9: Fire Treatment and Resultant Impacts *

Treatment	Effect	Advantage	Concerns
Surface fuels reduction	Reduces potential flame length.	Provides for safer and easier control while reducing torching.	Surface disturbance, less with prescribed fire than other techniques.
Increase canopy base height	Requires longer flame length to begin torching.	Reduce opportunity for fire to get into and become crown fire.	Opens understory and may allow increase in mid-flame wind speed.
Reduce canopy bulk density	Reduces probability of active and independent crown fire.	Reduces crown fire potential.	Wind speeds may increase and fuels may dry faster.
Retain larger fire resistant trees	Maintains trees with thicker bark and taller crowns.	Increases survivability of residual trees.	Removal of smaller diameter trees and no large diameter trees is economically less viable.

* Modified from Agee (2002).

Table 4-10: Fire Treatment Objectives Compared by Alternatives				
Treatment Objective	**Alternative 1 No Action**	**Alternative 2**	**Alternative 3 Proposed Action**	**Alternative 4**
Surface fuels reduction	Fuels would increase based on successional pathways.	Fuels would be reduced, but at lowest level (potential treatment of 3,320 acres).	Fuels would be reduced at highest level of treatment (potential treatment of 4,189 acres).	
Increase canopy base height	Canopy base height would decrease as suppressed regeneration and ladder fuels follow successional pathways.	Limited treatment of canopy base height will occur, primarily through the reduction of surface fuels.	Canopy base height would increase within both the surface fuels and some treatment of the overstory canopy.	Similar to Alternative 3, with slightly heavier level of treatment.
Reduce canopy bulk density	Many areas are at maximum, but small short term reduction could occur as trees in the overstory die out.	Limited treatment in overstory canopy with limited diameter range, primarily focusing on the defense zone.	Some level of active crown fire behavior would be reduced, but under extreme conditions, would provide limited reduction in crown fire behavior.	Due to greater increase in diameter range, will be able to better target active crown fire, but passive crown fire could occur.
Retain larger fire resistant trees	Potential to lose large trees due to stress and other disturbance factors.	Protection of larger trees would occur from surface fire effects, but potential to loss from crown fire.	Protection of larger trees would occur from surface fire and from limits on active crown fire, but not passive torching.	

Alternatives 2, 3, and 4 will result in conditions that meet these parameters to different degrees and to different spatial extents. Tables 4-11a and b summarize the estimated potential acres of treatment for the three alternatives and incorporates the seen and seldom seen areas of the project area. It estimates / projects acreage changes in the three hazard rating classes in the 1-10 year period after vegetation / fuel reduction treatments.

Alternative 2 would reduce the high hazard acreage from 69% to approximately 41%, with a corresponding increase in low hazard acres from 3% to 31% of the project area. (Table 4-11a)

Alternative 3 (Proposed Action) and 4 would reduce the high hazard acres from 69% to approximately 32%, with a corresponding increase of low hazard acres to 38% of the project area. (Table 4-11b)

Table 4-12a and b estimate the hazard condition classes for the alternatives in the 10-20 year period after treatments and when any pertinent long term maintenance work would be considered.

Table 4-11a: Hazard Classification with Potential Treatment and Post Treatment Acres by Zone
- Alternative 2 -

Ownership/Zone	Total Acres **	High Hazard						Moderate Hazard						Low Hazard					
		Seen			Seldom Seen			Seen			Seldom Seen			Seen			Seldom Seen		
		Initial Acres	Treat. Acres	Post Treat. Acres	Initial Acres	Treat. Acres	Post Treat. Acres	Initial Acres	Treat. Acres	Post Treat. Acres	Initial Acres	Treat. Acres	Post Treat. Acres	Initial Acres	Treat. Acres	Post Treat. Acres	Initial Acres	Treat. Acres	Post Treat. Acres
BLM																			
Comm. At Risk	1,546	624	312	328	80	64	19	401	201	359	270	216	95	149	75	488	22	18	258
Other WUI	17	15	8	8	0	0	0	2	1	5	0	0	0	0	0	5	0	0	0
Defense Zone	667	516	258	271	42	34	10	76	38	162	14	11	19	19	10	178	0	0	27
Threat Zone	1,796	1,656	662	1,027	122	73	52	9	4	320	0	0	35	9	4	327	0	0	35
Non-Interface Zone	536	497	0	497	39	0	39	0	0	0	0	0	0	0	0	0	0	0	0
BLM Total	**4,562**	**3,308**	**1,240**	**2,130**	**283**	**171**	**121**	**488**	**243**	**846**	**284**	**227**	**149**	**177**	**88**	**997**	**22**	**18**	**319**
Non-BLM																			
Comm. At Risk	1,436	412	206	216	122	98	29	408	204	361	458	366	179	35	18	278	1	1	372
Other WUI	37	27	14	14	0	0	0	10	5	15	0	0	0	0	0	8	0	0	0
Defense Zone	572	350	175	184	35	28	8	175	88	217	12	10	23	0	0	125	0	0	16
Threat Zone	292	197	79	122	14	8	6	66	26	97	15	9	12	0	0	44	0	0	11
Non-Interface Zone	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Non-BLM Total	**2,337**	**986**	**473**	**536**	**171**	**134**	**44**	**659**	**323**	**689**	**485**	**385**	**215**	**35**	**18**	**454**	**1**	**1**	**399**
All Ownership																			
Comm. At Risk	2,982	1,036	518	544	202	162	48	809	405	720	728	582	275	184	92	765	23	18	630
Other WUI	54	42	21	22	0	0	0	12	6	19	0	0	0	0	0	12	0	0	0
Defense Zone	1,239	866	433	455	77	62	18	251	126	379	26	21	42	19	10	302	0	0	42
Threat Zone	2,088	1,853	741	1,149	136	82	58	75	30	417	15	9	47	9	4	371	0	0	45
Non-Interface Zone	536	497	0	497	39	0	39	0	0	0	0	0	0	0	0	0	0	0	0
Total	**6,899**	**4,294**	**1,713**	**2,666**	**454**	**305**	**164**	**1,147**	**566**	**1,535**	**769**	**612**	**364**	**212**	**105**	**1,451**	**23**	**18**	**718**
Percent of Total		62%	25%	39%	7%	4%	2%	17%	8%	22%	11%	9%	5%	3%	2%	21%	0%	0%	10%

** River acres and 50' no treatment riparian zone buffers are not included.

Table 4-11b: Hazard Classification with Potential Treatment and Post Treatment Acres by Zone - 1-10 Years – Alternative 3 (Proposed Action) and Alternative 4

Ownership/Zone	Total Acres **	High Hazard						Moderate Hazard						Low Hazard					
		Seen			Seldom Seen			Seen			Seldom Seen			Seen			Seldom Seen		
		Initial Acres	Treat. Acres	Post Treat. Acres	Initial Acres	Treat. Acres	Post Treat. Acres	Initial Acres	Treat. Acres	Post Treat. Acres	Initial Acres	Treat. Acres	Post Treat. Acres	Initial Acres	Treat. Acres	Post Treat. Acres	Initial Acres	Treat. Acres	Post Treat. Acres
BLM																			
Comm. At Risk	1,546	624	374	268	80	72	12	401	241	350	270	243	73	149	89	555	22	20	287
Other WUI	17	15	9	6	0	0	0	2	1	5	0	0	0	0	0	5	0	0	0
Defense Zone	667	516	310	222	42	38	6	76	46	180	14	13	20	19	11	209	0	0	30
Threat Zone	1,796	1,656	828	869	122	98	29	9	5	398	0	0	46	9	5	407	0	0	46
Non-Interface Zone	536	497	199	308	39	20	20	0	0	94	0	0	9	0	0	94	0	0	9
BLM Total	**4,562**	**3,308**	**1,720**	**1,674**	**283**	**227**	**67**	**488**	**292**	**1,028**	**284**	**256**	**149**	**177**	**105**	**1,271**	**22**	**20**	**373**
Non-BLM																			
Comm. At Risk	1,436	412	247	177	122	110	18	408	245	352	458	412	145	35	21	326	1	1	419
Other WUI	37	27	16	12	0	0	0	10	6	16	0	0	0	0	0	10	0	0	0
Defense Zone	572	350	210	151	35	32	5	175	105	225	12	11	24	0	0	150	0	0	18
Threat Zone	292	197	99	103	14	11	3	66	33	105	15	12	12	0	0	55	0	0	14
Non-Interface Zone	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Non-BLM Total	**2,337**	**986**	**572**	**443**	**171**	**153**	**26**	**659**	**389**	**697**	**485**	**435**	**180**	**35**	**21**	**540**	**1**	**1**	**450**
All Ownership																			
Comm. At Risk	2,982	1,036	622	445	202	182	29	809	485	702	728	655	218	184	110	882	23	21	706
Other WUI	54	42	25	18	0	0	0	12	7	21	0	0	0	0	0	15	0	0	0
Defense Zone	1,239	866	520	372	77	69	11	251	151	405	26	23	44	19	11	359	0	0	48
Threat Zone	2,088	1,853	927	973	136	109	33	75	38	503	15	12	58	9	5	461	0	0	60
Non-Interface Zone	536	497	199	308	39	20	20	0	0	94	0	0	9	0	0	94	0	0	9
Total	**6,899**	**4,294**	**2,292**	**2,117**	**454**	**379**	**94**	**1,147**	**681**	**1,725**	**769**	**691**	**329**	**212**	**126**	**1,811**	**23**	**21**	**823**
Percent of Total		62%	33%	31%	7%	5%	1%	17%	10%	25%	11%	10%	5%	3%	2%	26%	0%	0%	12%

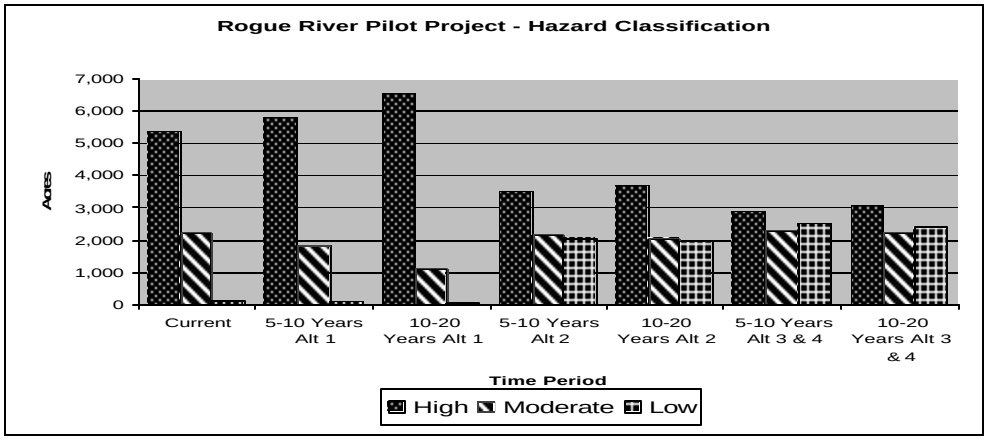
** River acres and 50' no treatment riparian zone buffers are not included.

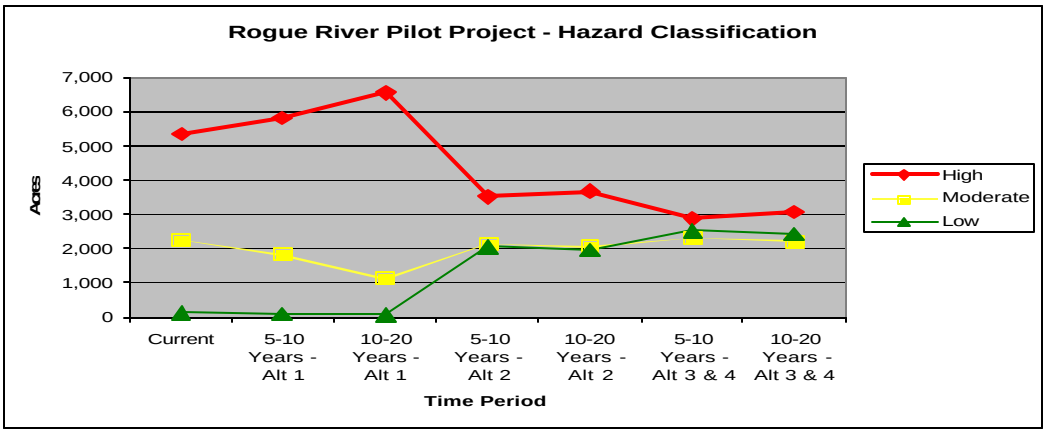
Table 4-12a: Hazard Class Acreages in 10-20 Years - Alternative 2							
	Total Acres	High Hazard		Moderate Hazard		Low Hazard	
		Seen	Seldom Seen	Seen	Seldom Seen	Seen	Seldom Seen
BLM Combined	4,562	2,164	127	852	156	957	306
Non-BLM Combined	2,337	564	52	680	222	436	383
All Lands Combined	6,899	2,728	179	1,532	378	1,393	689
Percent of Total acres		40%	3%	22%	5%	20%	10%

Table 4-12b: Hazard Class Acreages in 10-20 Years – Alternative 3 (Proposed action) and Alternative 4							
	Total Acres	High Hazard		Moderate Hazard		Low Hazard	
		Seen	Seldom Seen	Seen	Seldom Seen	Seen	Seldom Seen
BLM Combined	4,562	1,715	73	1,037	158	1,220	358
Non-BLM Combined	2,337	471	33	691	191	519	432
All Lands Combined	6,899	2,186	107	1,728	349	1,739	790
Percent of Total acres		32%	2%	25%	5%	25%	11%

4/27/03

Table 4-13: Rogue River Pilot Project - Hazard Classification							
Time Period		**High Hazard**		**Moderate Hazard**		**Low Hazard**	
Alternative 1 No Action	**Total Acres**	**Acres**	**% of Total Acres**	**Acres**	**% of Total Acres**	**Acres**	**% of Total Acres**
Current	7,732	5,354	69%	2,250	29%	128	2%
5-10 Years	7,732	5,804	75%	1826	24%	102	1%
10-20 Years	7,732	6,534	85%	1136	15%	61	1%
Alternative 2							
Current	7,732	5,354	69%	2,250	29%	128	2%
Potential Fuel Treatments	3,262	2,018	62%	1,178	36%	65	2%
5-10 Years	7,732	3,504	45%	2,167	28%	2,061	27%
10-20 Years	7,732	3,687	48%	2,067	27%	1,978	26%
Alternative 3 (Proposed Action) & Alternative 4							
Current	7,732	5,354	69%	2,250	29%	128	2%
Potential Fuel Treatments	4,120	2,671	65%	1,371	33%	78	2%
5-10 Years	7,732	2,883	37%	2,322	30%	2,527	33%
10-20 Years	7,732	3,073	40%	2,235	29%	2,425	31%





Surface Fuels and Surface Fire Behavior Modeling

All three action alternatives will reduce current surface fuels. Alternative 2 has the potential of treating 3,320 acres (48.1% of the treatable acres) of surface fuels, with no treatments occurring in the general forest zone. Alternatives 3 (Proposed Action) and 4 have the equal levels of understory / surface fuel treatment intensity, potentially treating 4,189 acres (60.7% of the treatable acres).

Surface fire behavior was modeled using the fire behavior modeling program (BehavePlus) to estimate the results of the proposed treatments in forest and brush stands typical of the project area. Current and anticipated post treatment fuel models were used (Northern Forest Fire Laboratory fuel models (Anderson 1982)). Expected fuel model changes from treatments which were used in the modeling are: a) fuel models 10 (timber with litter and understory) and 9 (hardwood litter) are changed to fuel model 8 (closed timber litter); and b) fuel model 4 (chaparral – 6 feet) is changed to model 6 (dormant brush). Adjustments were made to fuel models 8 and 6 to reflect the more open stands and dryer conditions that would result from hazard reduction treatments. Weather conditions used in the modeling were the typical summer fire season weather conditions at the 90th percentile (Fire Family Plus derived from 10 years of data collected at the Merlin RAWS).

Table 4-14 summarizes the modeling inputs and results.

Table 4-14: Comparison of Potential Surface Fire Behavior					
INPUTS	Fuel Model 10	Fuel Model 9	Fuel Model 8	Fuel Model 4	Fuel Model 6
1-hr Moisture (%)	4	4	3	4	3
10-hr Moisture (%)	5	5	4	5	4
100-hr Moisture (%)	9	9	8	9	8
Live Woody Moisture (%)	81	N/A	N/A	81	N/A
Midflame Wind Speed (mph)	5	5	6	5	6
Slope Steepness (%)	40	40	40	40	40
Fuel Loading (Tons/acre)	12.02	3.48	5.00	16.03	6.00
OUTPUTS	Fuel Model 10	Fuel Model 9	Fuel Model 8	Fuel Model 4	Fuel Model 6
Rate of Spread (max)(ch/h)	13.6	13.2	4.2	120.3	68.1
Heat per Unit Area (Btu/ft2)	1,413	416	224	2,896	565
Fireline Intensity (Btu/ft/s)	353	100	17	6,384	706
Flame Length (ft)	6.7	3.8	1.7	25.3	9.2

As modeled, it is anticipated that the proposed surface fuel treatments in the hardwood and forested stands will result in flame lengths well below the 4' objective. In the brushfields, fireline intensity and flame lengths would be reduced substantially, although the desired 4' flame length goal would not be met. These changes represent an appreciable improvement is wildfire suppression safety and potential effectiveness and an appreciable reduction in potential fire severity.

Crown Fire and Crown Fire Behavior Modeling

To estimate the change in crown fire potential that might result from the proposed crown thinning, a number of fuel reduction scenarios were modeled (Table 4-15) using the Fuels Management Analyst PLUS (FMA+). This looked at crown fire initiation levels in fuel model 9 based on canopy bulk density and canopy base height. In general terms, the current stand structure and a 20% reduction in the canopy would allow for crown fire initiation with mid-flame wind speeds of 1.5 mph. Crown fire activity would move from passive to active crown fire at mid-flame wind speeds of 9 mph for the current stand and 11 mph for a stand with a 20% reduction in the canopy. A 40% reduction in the canopy would require a mid-flame wind speed of 7 mph for passive crown fire initiation and 14 mph for active crown fire. With a 70% reduction in the small diameter understory, the canopy base height would need to be below 25' under a 19 mph mid-flame wind speed for crown fire initiation.

Table 4-15: Crown Fire Initiation Considerations – Fuel model 9					
Reduction of Overstory	Mid-flame Wind Speed (mph)	Fire Type	Critical Flame Length	Flame Length	Canopy Base Height
0% Reduction	1.5	Passive	2.7	3.4	3'
	9.0	Active	2.7	7.3	3'
20% Reduction	1.5	Passive	2.8	3.4	3'
	11	Active	2.8	8.2	3'
40% Reduction	3.0	Surface			
	7.0	Passive	6.5	6.6	10'
	14	Active	6.5	9.7	10'
70% Reduction	19	Passive	12.2	12.2	25

Source: Martin 2003.

When the above scenarios were modeled using fuel model 8 (representing post treatment conditions) and the same assumptions and wind speeds, crown fire initiation did not occur.

A further analysis (Table 4-16) looked at the number of potential days where crown fire initiation could occur. Based on 10 years of wind speed data from the Merlin RAWS and using the breakpoint wind speeds identified above, days of potential crown fire activity could be determined. This is based on the 80th percentile for ERC (Fire Family Plus) and a critical flame length of 3+' to fit the parameters found in the FMA+ runs.

Table 4-16: Number of Days of Potential Crown Fire Activity			
0% Reduction	20% Reduction (approximates Alt 2)	40% Reduction (approximates Alt. 4)	70% Reduction
388 Passive	388 Passive	139 Passive	4 Passive
87 Active	55 Active	33 Active	0 Active

Source: Martin 2003.

The frequency of wind speed at the breakpoints identified in FMA+ for initiation of passive and active crowning were sought from this data. The findings show there are from 39 days a year under the current stand structure where crown fire initiation could occur. If the stand was reduced by 70%, mostly in the small diameter stems, only 0.4 days per year could support crown fire initiation. The Merlin RAWS (closest RAWS to the project area) provided wind data for this analysis, but it should be noted that in the river corridor, winds are channeled and many times experience greater wind speeds than the surrounding area, thus it would be expected that the number of days could increase.

Alternative 2 has a minimal impact on crown bulk density, while starting to address the canopy base height through understory treatments. Modeling at a 20% reduction would best represent this alternative. No treatments occur to the overstory in the General Forest Zone.

Alternative 3 (Proposed Action) starts to address the canopy bulk density issue in all zones, with a level between the 20 and 40% canopy reduction represented.

Alternative 4 goes the farthest at reaching the optimal level of fuels reduction treatments to meet the fire and fuels management objectives through treating the canopy bulk density and canopy base heights. The 40% canopy reduction represents Alternative 4. Thus, the crown fire may stop spreading, but not necessarily stop torching (Agee et al 2000). Under the alternatives presented, the modeled 70% canopy reduction, which would largely preclude crown fire spread, would not be realized.

Throughout the project area, numerous buffers will not be treated under all three action alternatives in order to other resource goals (*i.e.,* Aquatic Conservation Strategy, fisheries, special status species, etc.). These areas can act as conduits for surface fire to be carried by ladder fuels into the crown canopy and modeled as a 0% reduction.

Fire Condition Class

Vegetation / fuel treatments are intended to take areas from a higher fire condition class to a lower condition class.

In areas of Fire Condition Class 3, multiple treatments may be required to bring conditions back to the historical fire regime and before prescribed fire could be utilized to manage fuels. Fire Condition Class 2 may allow either prescribed fire and / or mechanical treatments to bring an area back towards it historical fire regime. Areas of Condition Class 1 may require maintenance treatments to maintain it in this class.

Under Alternative 2, moving stands to Fire Condition Class 1 would be difficult due to the limited treatment in the overstory. Alternative 3 would provide a greater opportunity of reaching Condition Class 1; however, the overstory treatments limit the potential of reaching it. Alternative 4 offers the greatest potential to produce Fire Condition Class 1 conditions due to its proposed overstory canopy treatments.

The degree to which the alternatives might shift from high to low condition classes across the project area has not been estimated, but would be expected to parallel the hazard classification shifts that were previously outlined with some reduction in the overall gain due to the influence of alternative differences in canopy density changes.

4.2.3 Cumulative Effects

Three other BLM fuel reduction projects (including Maple Syrup, Stratton Hog, and Pickett Snake) are currently in progress in the watershed. Approximately 2,660 acres, within 1.5 miles of the current project, are involved. The present project compliments these other projects as the treatments at the lower positions on the slope help to protect to upper elevations because fire typically travels upslope at greater rates then down slope. Thus the areas where the risk is highest will have reduced hazard and the potential for a large fire will be reduced. At the watershed scale, this project complements other fuel reduction treatments located higher in the watershed. Treating the lower elevations where fire risk is greatest provides protection to the areas above, it as fire typically travels upslope faster than down. Among all of these projects, approximately 8% of the 5th field watershed will have received proactive fuel hazard reduction treatments.

4.2.4 Summary and Conclusions

Alternatives 2, 3 (Proposed Action), and 4 would all reduce surface fuels in a substantive way, although to different degrees. All alternatives treat most intensively in the Defense Zone, the areas of highest property values (Structures, CARs, WUIs), and in progressively lower intensities in the other zones. Alternative 2 does not treat the General Forest Zone; Alternatives 3 and 4 treat up to 50% of it. All alternatives would retain large fire resistant trees.

In treated forest stands, surface flame length objectives would be met. Canopy base height would be increased most appreciably in Alternatives 3 (Proposed Action) and 4 with a consequent reduction in the potential for crown fire initiation. Alternative 4 would reduce canopy bulk density to the greatest extent. Alternative 2 would reduce the high hazard acreage from 69% to approximately 45%, with a corresponding increase in low hazard acres from approximately 2% to 27% of the project area. Alternative 3 (Proposed Action) and 4 would both reduce high hazard acres from 69% to approximately 37%, with a corresponding increase of low hazard acres to 33% of the project area.

When considered in conjunction with understory ladder fuel reductions, Alternative 2 would not change the number of days of passive crown fire activity, but would reduce the number of days of potential active crown fire activity by an estimated 35-40%. Alternative 4 would reduce potential passive and active crown fire days by an estimated 60–65%.

The progressively greater levels of fuel hazard reduction of Alternatives 2 through 4 would result in progressively more fire-resilient forests. This in turn translates into progressively more effective and safer fire suppression operations when required. Alternative 4 would result in the greatest reduction in potential fire intensity and severity and the greatest increase in public and firefighter safety.

The Proposed Action and alternatives would all result in safer and more effective fire suppression actions, increased public ingress/egress safety, and increased property protection. The degree of improvement would be in proportion to the extent of fuel hazard reduction each alternative presents. The strategic reduction of crown and surface fuels could greatly reduce wildfire intensity and spread rates. Treating areas that are tactically important for fire suppression actions (e.g., roadways, higher areas) increases the options for safe effective firefighting.

4.3. Resource: Wild & Scenic River Outstandingly Remarkable Values (ORV)

4.3.1A Scenic / VRM / Scenery ORV

The Rogue River's diversity of scenery is due to its geology, topography, and relatively undeveloped visual appearance. The potential impact on the visual quality and the scenic ORV was identified as an important planning and analysis issue.

4.3.1A.1 Affected Environment

Map citation: VRM Map, showing Seen/Seldom Seen Areas, Focal Point Sensitivity and Recreation Sites. (See Maps 4A & 4B.)

The Hellgate Recreational Section of the Rogue National Wild and Scenic River is managed for VRM Class I (see glossary). The existing character of the landscape to be preserved may be rural, agricultural, recreational, or even urban. It does not necessarily mean preservation of a naturalistic or wilderness landscape character.

Currently, the Hellgate Recreational Section has numerous paved, two-lane roads, more than 180-private residences, farms, orchards, and numerous recreation sites.

Historically, this section of the Rogue River was extensively modified by mining and logging. Forest vegetation was widely spaced, with very little brush. In addition to human activities, such as logging and mining that disturbed forest vegetation, wind storms, fires and insect infestations thinned the forest vegetation, creating an open, park-like appearance along the Rogue River.

Andersons Mine - 1900s - Rogue River, Oregon
from Josephine County Historical Society

Approximately 90-years of fire exclusion have altered the landscape, as compared to natural, ecological changes that would have occurred if wildfires and repetitive underburning would have continued. The existing characteristic landscape is not ecologically sustainable and additionally, it poses a severe fire threat. A comparison of historic and recent photographs shows the difference in vegetation densities, and the differences in natural vegetative patterns of open, park-like stands, compared to dense, jungle-like forests with existing wildland fuel conditions.

The characteristic landscape is a rich diversity of scenic elements. The character of the landscape is a mosaic of colors, textures, lines and forms, created by the diversity of mountainous terrain, mixed conifer and hardwood vegetation, punctuated by serpentine and basalt rock outcrops. Light- and medium-green hardwoods of white oak, tan oak and madrone grow in patches, intermixed with stands of dark-green

conifers, such as Douglas-fir, ponderosa pine and sugar pine. Light green brushfields with buckbrush, poison oak, live oak and chinquapin oak are scattered in patches across the steep topography. Closer to the river and along mountain streams, riparian vegetation is predominantly green blackberries, poison oak and gray-green willows, with scattered occurrences of native Pacific dogwood and orchard trees, adding seasonal color of white and pink flowers in spring.

Recreationists view the corridor from numerous recreation sites, the river surface, sand- and gravel-bars and paved roads. The Merlin-Galice Road, a part of the Galice-Hellgate National Back Country Byway, parallels the river in the Dunn Reach and is the primary public access to Josephine County and BLM lands. There are a number of developed and primitive camp areas and day-use sites, plus numerous trails and boat landings.

Distance zones of visibility for the entire study area are foreground/middleground, based on topographic screening (see glossary). All of the study area is located within the foreground/middleground distance zone as viewed from the river and nearby roads.

Within the 8,657-acre study area, approximately 83% is mapped as "seen areas" (see glossary) and 17% is mapped as "seldom seen areas" (see glossary).

The 27-mile Hellgate Recreational stretch of the Rogue National Wild and Scenic River is divided into two reaches – the Applegate Reach and the Dunn Reach (USDI 2003).

Applegate Reach

In the Applegate Reach (12.8 miles), the river has a gradient of about 7 feet per mile and the channel averages approximately 400 feet wide. It is essentially flat to rolling terrain with the river meandering through an alluvial plain. There are scattered groves of cottonwood trees with light brown trunks, plus willow, ash and alder trees with dark gray and light gray tree trunks. Lush green willows and blackberries line the riverbanks and streams, creating a soft visual texture of deciduous vegetation reflected on smooth, flat waters of the Rogue. The surrounded landscape consists primarily of even-textured, tan and green agricultural fields on the floodplains, with a backdrop of mixed conifer (Douglas-fir, ponderosa pine, sugar pine) forests on rolling hills, creating partial enclosure of the view.

Visual Landforms

The serpentine river has created meanders, oxbows and large floodplains in the flatter terrain. It is incised in riverbanks that are 10' to 15' high on each side of the river, creating topographic screening for the relatively flat landforms above the river. Foothills and mountains create containment beyond these flats.

Rogue River - Glass Plate Photo - 1800s
From Josephine County Historical Society

Historic Vegetation

Scattered cottonwood, willow, pine and alder trees lined the banks. Agricultural fields created a smooth texture of light brown, tilled soil in winter and verdant fields of crops in the summer. Middleground and background mountains had sparse tree cover, remnants of logging.

Present-Day Vegetation

As compared to historic landscapes, vegetation is denser and riverine trees are larger and taller. Vegetation remains growing in dense groves that line the banks. Beyond the riverbank, agricultural fields are visually the same as historic vegetation in the area. Middleground and background mountains are more densely covered with conifers, hardwoods and brushfields.

Further downriver, approaching Hog Creek, the terrain becomes steeper and more angular. Light green woodlands of cottonwood, ash and alder transition into darker green conifer forests, with their medium to coarse texture of vegetation.

Dunn Reach

Entering the Dunn Reach, the Rogue has carved its way through a narrow canyon called Hellgate, with near-vertical, dark gray basalt bluffs almost completely devoid of vegetation. The horizontal form of the river contrasts with the near-vertical bluffs that contain the twisting, narrow, tumultuous Rogue River. Hellgate, with its vertical relief and complete enclosure of the view, creates a dramatic portal as people raft or boat from the Applegate to the Dunn Reach.

Below Hellgate, the landscape opens up to long vistas of dense forests on steep, rugged mountain slopes in the middleground and background. In the Dunn Reach (14.5 miles), the river is steeper and faster. It has a gradient of approximately 10 feet per mile and narrows to approximately 200 feet in width, creating more white-water rapids. The forest vegetative character augments steep terrain to provide a vertical edge and spatial enclosure at the river. Concentrated areas of hardwoods (tan oak, white oak, and madrone) with adjacent dense conifer stands (Douglas-fir, ponderosa pine, sugar pine) and contrasting barren serpentine rock outcrops create an interesting, scenic mosaic of forms, lines, colors and textures. Soft textures and rounded lines of gray-green tan oak/live oak hardwood forests, next to coarse textured, dark green Douglas-fir/mixed evergreen forests, create visual diversity and interest. The occasional intrusions of serpentine rocks and soils in the lush forested landscape create a contrast of smooth and coarse textures. Waterforms are a series of flat-water pools punctuated by whitewater rapids, with numerous large gray boulders protruding from the river and lining the banks.

Visual Landforms

The serpentine river has carved a circuitous, twisting route through the steep, mountainous terrain. Slopes are predominantly from 51% to 200%, with scattered flats at sand- and gravel-bars, and riverine benches. These flats and benches form visual relief from the steep mountainsides and cliffs that visually dominate and contain the view.

Pre-Historic Vegetation

Vegetation used to be more open, with park-like stands of trees that were created by frequent under-burning by Native Americans. As hunter-gatherers, native peoples knew that forests cleared with fire made it easier to traverse, hunt and gather. *"Takelma Indians in Oregon set fires in the mountain forests around the Rogue River to facilitate the driving of game." "Wherever Indians gathered acorns, especially in California and Oregon, they cleared with fire. This kept oak woodlands open and productive." "Indians who lived in the coastal mountains sometimes set their fires before gathering the acorns to roast them where they lay." "The trees [tanoak] are better if they are scorched by fire each year because burning kills disease and pests and it leaves the ground underneath the trees bare and clean and it is easier to pick up the acorns." (Bonnicksen, 2000. "America's Ancient Forests: From the Ice Age to the Age of Discovery," John Wiley & Sons.)*

Historic Vegetation

Subsequent to that era, gold mining, logging, human-caused and lightning-ignited fires have continued to alter vegetation patterns. Additionally, "the Columbus Day gale of 1962 produced wind velocities that had not been experienced in Josephine County since half of the marketable timber was blown down in 1892." (*Sutton, "110 Years With Josephine County, The History of Josephine County – 1856 to 1966"*).

Old Channel Mine, Galice Oregon - 1900s
From Josephine County Historical Society

Historic photos show that vegetation, both trees and shrubs, were widely scattered, giving an open, park-like feeling to the forest. Therefore, the ability to see through the forest, its transparency, was greater historically and when Congress designated the Rogue as a Wild and Scenic River in 1968.

This photo of old mining claim buildings, located at the present-day site of the Chair Recreation Site, shows more widely spaced vegetation in the forest and along the river.

Present Day Vegetation

Crowded, overgrown vegetation provides dense visual screening and the forest is very opaque. Forests of thick vegetation, dark green, mixed conifer trees and thick groves of gray-green hardwood trees and brush, completely cover the mountainsides, except at scattered serpentine outcrops and steep basalt bluffs. The forested mountainsides and decades of fire exclusion have created unnaturally dense forests. The dense growth of trees and shrubs has limited visibility through the forest, creating a jungle-like appearance of black and gray tree trunks, dark green tree canopies, low branches, fallen trees, thick brush and forest litter on the ground. Therefore, the forest is less transparent now than it was when Congress designated the Rogue as a Wild and Scenic River in 1968, and much less transparent than historic landscapes.

"Osborne" Photos

Following are excerpts from *"Steve Peak: 1933 and 1995 – What Has Fire Suppression Done?" Between 1933 and 1935, the Forest Service took 813 "Osborne" photographs from fire lookouts across Washington and Oregon. The Osborne, named after designer W. B. Osborne, was a combination transit and camera, able to take 360-degree photos – photos providing full-circle views. Currently, a project is underway to take photos from the same sites from which the original Osbornes were taken. When these retakes are compared to the originals, change in the landscape from the mid-1930s to the present will become more apparent. Vince Randall is working on the Osborne retakes for the Siskiyou National Forest and BLM. Randall feels that major impacts on forests have not come primarily from high-profile activity such as road-building and*

clearcuts, but rather "have come subtly through fire exclusion." This has allowed the proliferation of an understory so dense and conifer overstocking so pronounced, that "You can't get off the trail today. Randall also feels that the Osborne retakes show an expanding forest. Where fire has been kept out of the system, the forest has expanded. Along ridges previously open, forests now spread. Through it all – settlement, management, fire exclusion – Randall sees a forest of pronounced vigor." McKinley & Frank, 1996. "Stories on the Land: An Environmental History of the Applegate and Upper Illinois Valleys." Joint BLM & FS publication.

Public Preferences for Visual Resources

Research results indicate the public prefers "managed" or "fuel treated" landscapes to untreated landscape or intensely burned landscapes *(Scott, 1998. Fuel Reduction in Residential and Scenic Forests: a Comparison of Three Treatments in a Western Montana Ponderosa Pine Stand.)*

"Fire damage to forest stands immediately reduces the scenic beauty of the area, the magnitude of the impact depending on the severity of the fire and the level and timing of recovery. Prescribed burns were found to negatively impact scenic beauty in the short-term, but with ground vegetation recovery, prescribed burns can enhance scenic beauty after a few years. This is primarily due to the elimination of slash after harvest or increasing visual penetration through reducing understory density. More severe prescribed burns may decrease scenic beauty, since they may leave visible scars." (Rosenberger, 1998. "Assessing Forest Scenic Beauty Impacts of Insects and Management." USDA FS.)

4.3.1A.2 VISUAL ENVIRONMENTAL CONSEQUENCES

Visual Effects Common to All Alternatives

All proposed activities would be designed, planned, implemented and monitored to protect and enhance the natural scenic quality (an outstandingly remarkable value, or ORV) and character of the landscape within the Hellgate Recreational Section of the Rogue National Wild and Scenic River and are designed to meet VRM Class I objectives.

Effects Common to All Action Alternatives

Landform – No change.
Rockform – No change.
Waterform – No change.

Vegetation

- Vegetative screening of structures, per BLM scenic easements and State Scenic Waterways Act requirements and objectives, would be safeguarded to protect, restore, or enhance the scenic view of the landscape as seen from upon or directly adjacent to the river or the backcountry byway.
- Re-creation of open, park-like stands of trees would increase forest transparency, reduce forest opacity, move toward a similarity to historic landscape conditions and restore natural scenic quality (ORV).
- In seen areas, percentage limitations on crown canopy changes would limit effects on natural scenic quality (ORV) so that the level of change to the characteristic landscape would be very low and would not attract attention.
- Phased treatments and multiple entries with minimal crown canopy changes during each entry, spaced approximately two- to three-years apart in seen areas, would gradually create open, park-like stand of trees. This would gradually decrease forest opacity and increase forest transparency. Color contrasts

created in one phase would be greened-up before another phase, so minimal visual contrast would be created during any phase.

- The fifty-foot (50') strip of vegetation left untouched next to the Rogue River and along certain recreation roads – the Merlin-Galice Road, Robertson Bridge Road and Lower River Road – would help visually screen ground disturbance activities.
- Directional falling of trees would lessen damage to the remaining trees and shrubs (residual stand), and thereby, reduce visual impacts.
- In seldom seen areas, fuel treatment activities would not be visible, and therefore, would have no short term or long term visual effect.
- Project design features (PDFs) for other resources aid visual resources, e.g., un-entered patches of 1/10th- to 3-acres would be scattered throughout the project area to maintain diversity and for wildlife habitat. Dense thickets of trees would be thinned to density levels that would improve stand growth and individual tree vigor. Larger hardwoods and scattered large conifer trees would be reserved for the future large-stand growth component. Stream buffers and sensitive plant zones would remain untouched. These PDFs would create a natural mosaic of visual diversity and have a positive effect on natural scenic quality (ORV).

Summary of Effects That Would Vary By Alternative

Vegetation – Vegetative response would change by alternative.

Under Alternative 1, No Action, vegetation would not be changed, altered or managed, and the existing character of the landscape and the over-stocked vegetation density of the forest would remain. Visibility through the forest would continue to be limited by the dense vegetation, and opacity of the forest would continue to be dark and dense. There would be no change to the characteristic landscape.

Under Alternative 1, No Action with Fire, visual resource characteristics (form, line, color, and texture) of existing vegetative character could change dramatically, depending on fire location, intensity, timing and suppression/containment response. The level of change to the characteristic landscape could be very low and would not attract attention, or it could be very high and attract much attention, depending on fire characteristics.

Under Alternative 2, crown canopy vegetation would not be altered noticeably. Overall visual effects of ground-cover disturbance would be slightly noticeable in the short term, 1- to 2-years, and negligible in the long term. Overall landscape character would not change dramatically and existing vegetation would remain with medium-coarse textures. The level of change to the characteristic landscape would be very low and would not attract attention.

Under Alternative 3 (Proposed Action), crown canopy vegetation would be altered slightly, creating coarser textures and more open canopies in the Defense Zone and Threat Zone. Overall visual effects of ground-cover disturbance would be similar to Alternative 2. Re-creation of open, park-like stands of trees would increase forest transparency, similar to historic landscapes. The level of change to the characteristic landscape would be low and would not attract attention.

Under Alternative 4, crown canopy vegetation would be most altered of any alternative, creating coarser visual textures with more spacing between tree crowns. Removal of large trees in the areas closest to human occupancy (CARs, WUI and Defense Zones) would have the greatest potential impacts to visual resources. Overall visual effects of ground-cover disturbance would be similar to Alternatives 2 and 3. Re-creation of open, park-like stands of trees would increase forest transparency, similar to historic landscapes. The level of change to the characteristic landscape in the Defense Zone could be moderate and could potentially attract attention. The level of change to the characteristic landscape in the Threat Zone and General Forest Zone would be low and would not attract attention.

Cumulative Effects

Within the viewshed of the Rogue River, yet outside the WSR boundary, there are several timber sale areas that are visible from the Rogue River, Merlin-Galice Road, Lower River Road, Robertson Bridge Road and various recreation sites in the corridor. Examples are Picket Charge, Maple Syrup and Stratton Hog Timber Sales. These timber sales have been designed and planned by the BLM to meet VRM Class II, where visual changes are evident, but do not attract attention. VRM Class II is the appropriate VRM Class outside the Wild and Scenic River Corridor.

The Stratton Hog Timber Sale is already logged, and there were no adverse effects to the visual resources. In the center of the photo to the left, a logging helicopter is visible just below the ridgeline, but the harvest unit is not noticeable. Implementation of these other timber sales will be similar, and will not have an adverse cumulative visual impact on the Rogue WSR.

VRM Summary/Conclusions

In all action alternatives, re-creation of open, park-like stands of trees would increase forest transparency, similar to historic landscapes.

In Alternatives 2 and 3, because of the presumed effectiveness of Project Design Features and considering the existing diversity of landscapes within the RNWSR corridor, impacts to visual resources would be minimal. Areas treated would meet VRM Class I objectives, and added to untreated areas that are left for biological and watershed buffers, would add to scenic diversity and natural scenic quality (ORV). Phased implementation in seen areas would further lessen psychological impacts to changes in natural scenic quality (ORV).

In Alternative 4, removal of large trees in the areas closest to human occupancy (CARs, WUI and Defense Zones) would have the greatest potential impacts to visual resources. The level of change to the characteristic landscape in the Defense Zone could be moderate and could potentially attract attention. The level of change to the characteristic landscape in the Threat Zone and General Forest Zone would be low and would not attract attention.

4.3.1B Recreation ORV

The diversity and quality of certain types of recreation were recognized as one of the ORVs that caused the river to be designated as a National Wild &Scenic River. It was recognized for its whitewater float trips and salmon and steelhead fishing. Other recreation activities recognized included hunting, swimming, hiking, boating, picnicking, camping and sightseeing. The proposed alternatives will not affect the opportunities for any of these activities. The sightseeing opportunities will remain essentially the same (see Scenic / VRM Section 3.3.1A and the Fisheries Section 3.8).

4.3.1C Fisheries ORV

The robust salmon and steelhead fishery was an identified Outstandingly Remarkable Value of the Rogue National Wild and Scenic River. As noted in the fisheries effects discussion (Section 3.6), the proposed alternatives will not adversely affect or change this value.

4.4 Resource: Vegetation / Silviculture

4.4.1 Affected Environme nt / Current Condition

There are five distinct vegetation communities in the project area reflecting the dry southwest Oregon climate and the extremely diverse mix of soil and rock types. This diversity has resulted in a highly diverse mosaic of plant communities and a comparatively large number of special status plants.

4.4.1A Vegetation Communities

4.4.1A.1 Mixed Evergreen

The mixed evergreen forest is the most common forest type of the Siskiyou Mountain region. It is found in areas that are relatively warm and wet during the winter and hot and dry during the summer months. Douglas-fir and tanoak are the most important trees with madrone and oaks becoming more important on drier sites (Franklin and Dyrness 1984). Douglas-fir and tanoak plant communities are on both sides of the river downstream of Robertson Bridge. The most common plant associations are Douglas-fir/canyon live oak-poison oak and Douglas-fir/black oak-poison oak on southerly aspects, and Douglas-fir/tanoak/canyon live oak or tanoak/Douglas-fir/canyon live oak-dwarf Oregon grape on northerly aspects.

Upstream of Robertson Bridge the forest is similar although with more ponderosa pine and less canyon live oak or tanoak. Typical plant associations include: Douglas-fir/dry shrub (manzanita, buckbrush), Douglas-fir/ponderosa pine-poison oak, and Douglas-fir/black oak-poison oak.

4.4.1A.2 Oak Woodlands

Interspersed throughout the length of the river corridor are drier sites with shallower soils and open canopies of deciduous oaks and grasses. White oak dominates with black oak along transition zones between the woodlands and forest. Dominant plant associations are white oak/Douglas-fir-poison oak (wetter sites where more tree species diversity exists) and white oak/hedgehog dogtail grass (drier sites with white oak overstory). Grasses found in these oak woodlands tend to be non-native due to a history of heavy human influences.

The pine-oak, oak-savanna, and woodland vegetation have a structure that is quite different from historical conditions. They are currently overly dense and competing for resources. Ladder fuels are extensive and the potential for a severe wildfire is very high.

4.4.1A.3 Riparian

The riparian zone along the river is a mixture of river cobble, native riparian forest, small wetlands, sloughs, and highly disturbed areas (e.g., old agricultural fields). Willows are found immediately adjacent to the water while large cottonwoods and Oregon ash dominate the flood plain. Alders are present as are bigleaf maples on the higher banks. Large ponderosa pines sometimes occur on the larger flood plains. Disturbed areas have been invaded by purple loosestrife, Himalayan blackberry, teasel, common tansy, campion, poison hemlock, burdock, and such agricultural plants as hops and fruit trees.

The tributary drainages, especially downstream of Robertson Bridge, are lush with native riparian vegetation dominated by Douglas-fir, bigleaf maple, Oregon ash, and a diversity of ferns.

4.4.1A.4 Serpentine

Serpentine derived soils occur primarily in the vicinity of Hellgate Bridge. They support a high number of

endemic plant species typical of this soil type.

4.4.1A.5 Rock Outcroppings/Cliffs

Downstream from Hog Creek, cliffs of both serpentine rock and other parent rock are common. These outcroppings support plant species, such as Oregon cliff brake, penstemmon, lewisia, maidenhair fern, and yerba santa. A unique assemblage of moss species has been found on these sites.

4.4.1B Plant Series within the Five Vegetation Communities.

Vegetation communities can be subdivided into plant series and plant associations (Table 3-17; Maps 12A and 12B). The plant series level is broad and useful for evaluating vegetation responses to management and to natural gradients, such as aspect, slope, slope position, soil type, and moisture. This project's vegetation / fuel treatment prescriptions (Appendix B-1) are based on plant series.

Table 4-17: Plant Series within the Project Area

Plant Community	Plant Series	Total Acres	% of Total	BLM acres	% of BLM
Mixed Evergreen	Douglas-Fir	2,831	38	2,039	27
	Douglas-Fir / Tan Oak	631	8	482	6
	Tan Oak / Douglas-Fir	723	10	592	8
Oak Woodlands	White Oak	622	8	525	7
Riparian	Riparian Hardwoods	1,050	14	630	8
Serpentine	Non Forest	408	5	284	4
Rock Outcrops / Cliffs	Non Vegetated	188	3	184	2
	Developed - Vegetated	994	13	138	2
TOTAL (excludes acres of river)		7,447	-	4,874	-

Most of these plant series developed naturally with periodic disturbance events. Historically, the primary disturbance was wildfire, but wind and flooding are periodically important. Fire suppression this century and the construction of upstream dams have greatly altered historic disturbance events and cycles.

Disturbance events, especially wildfire, play an important role in affecting vegetation density, seral diversity, and woody debris accumulations. Eighty to 100 years of wildfire suppression has resulted in vegetation densities that are extremely high. These densities are not sustainable over time. This, coupled with an extended drought, has reduced forest stand vigor below natural levels. Low tree and plant vigor, increased insect and disease activity and increasing amounts of conifer and oak mortality have come to typify forest conditions in the project area.

4.4.2 Environmental Consequences of the Alternatives

4.4.2(1) Alternative 1 - No Action

Forest stands in the project area are highly susceptible to over dense conditions and extended drought. Regardless of the vegetation series, the No Action Alternative will result in a continued increase in stand density, canopy density, species shifts, ladder fuel density and distribution. Stand vigor will continue to decline. Insect and disease susceptibility and outbreaks will increase with a consequent increase in tree mortality. The effect of this can be seen in two 20-acre areas adjacent to the project area which are currently experiencing heavy Mountain Pine and Western Pine Beetle infestations. Overall fuel loadings will increase as will the potential for intense and severe wildfire. Vegetation density will continue at levels that are not sustainable over time.

4.4.2(2,3,4) Alternatives 2, 3 (Proposed Action), and 4

The consequences of each alternative are addressed for each plant series. The anticipated vegetation results are based on an integration of Table 2-1: Proposed Alternatives and the vegetation / fuels treatment prescriptions in Appendix B-1.

As noted, forest stands are in decline due to increased density within all stand layers. Alternative 2, because it reduces only a portion of the lower stand layer density, will have the least impact on the declining stand vigor. The increased diameter range of vegetation treated with Alternative 3 (Proposed Action) will impart substantial stand density reduction in the lower stand layers. It will introduce canopy gaps such that individual larger trees will benefit from increased growing space and resources. It will have an intermediate impact on reversing declining stand vigor. Alternative 4 will result in the greatest degree of stand vigor and health improvement. This is due to density reductions in all canopy layers. It provides the greatest opportunity to apply site specific stand treatment options. Alternative 4 will create a pattern of forest canopy layers where individual trees and total stand growth is increased. It will allow more space for growth in the larger diameter classes and it will move the forested landscapes towards one that is dominated by larger older trees.

4.4.2.2.a Oak Woodlands

All of the action alternatives will reduce existing biomass and will arrest the successional shift toward species poorly suited to these sites. The decline of pine and oak species will be reduced and stands will move toward historically appropriate structures that make them less susceptible to severe wildfire. Thinning of the oaks would promote growth and development of large, full-crowned oak trees, producing greater amounts of acorns. Reta ining oaks greater than 8?DBH will perpetuate the existing shade pattern mosaics that will benefit native grasses and discourage shrub release.

4.4.2.2.b Douglas -Fir and Pine Series

Immediately following either Alternative 2, 3 or 4, treated stands will have density levels closer to the carrying capacity of the site. Species composition will be well represented with Douglas-fir, ponderosa pine, sugar pine, and incense cedar. Hardwood species would occur as an occasional stand component either singly (California black oak, bigleaf maple) or in clumps (madrone, white oak). Trees sizes would include seedlings, saplings, and small and large conifer trees. The residual trees (greater than 8"DBH) would be characterized by co-dominant or dominant attributes, such as, crown ratios >35%, improved growth rates and larger diameters. The mosaic of size classes would provide the structural diversity not found in adjacent meadows and shrublands. The reduced crown closure within these stands will range within 40-80%. Basal area ranges from 100 -280 ft^2 / acre. The higher crown closure and basal area would occur in areas that are buffered or reserved from treatment. Unentered patches of 0.1 - 3 acres would be scattered in most of the units to maintain diversity and for wildlife habitat. The larger hardwoods will be reserved. Scattered large conifer trees will be reserved for the future large-stand growth component. Pine sites (areas where mature ponderosa pine is a dominant overstory component) would be thinned to density levels that will improve stand growth and individual tree vigor. In pine site areas, most of the competing second growth component would be removed, creating site conditions suitable to produce and maintain large ponderosa pine. Stage 1 and 2 snags will remain for wildlife. The large tree selection areas should create openings large enough to promote and establish Douglas-fir or pine regeneration.

In 5-10 years and upon completion of the secondary treatment, conditions should be created so that a distinct canopy layer of reproduction can be formed.

In 10-50 years, these stands will still operate as a DF/Pine ecosystem. Succession with regeneration and growth is not likely without the reintroduction of disturbance in all canopy layers.

4.4.2.2.c Douglas-fir/Tanoak and Tan Oak/ Douglas-fir Expected Results

The understory and overstory canopy reduction treatments will cause the necessary disturbance to provide individual tree growing space and for stand differentiation to continue. Crown ratios throughout the stand will be increased over time. Stand density will be reduced to levels that reduce competition between trees. Consequently, growth rates will increase. Tree vigor and resiliency to insect and disease attack will be enhanced as competition is decreased.

4.2.2.d. Riparian /Hardwoods Expected Results

Little fuel reduction activity is anticipated in the Riparian/Hardwood plant category. River dynamics introduce incremental disturbances. When combined with the autoecology of the riparian plant species, many of the areas of this category remain in a low wildfire hazard condition. Blackberries will continue to be the primary contributor to fuel hazard in these areas and near structures.

4.4.3 Cumulative Effects

At the project area scale, the vegetative diversity would continue to be high, both plant series and stand conditions. Overall forest health and resiliency would be greater across the project area with a decreased potential for the stand density mortality due to insects and disease. The potential for forest loss due to severe wildfire would be diminished. Species representation across the project area would be better maintained into the future by increasing forest resiliency throughout the corridor.

As a proactive forest health and fuel reduction project, it will, in combination with the other landscape management projects in the 5th field watershed (Pickett Snake, Stratton Hog, Peavine, Maple Syrup, and Cenoak) contribute to a greater degree of forest diversity and structure, and vegetative resiliency in the watershed. Cumulatively, these projects will have evaluated and, where appropriate, implemented forest health improvement activities on upwards of 50% of the BLM administered land in the 5th field watershed.

4.4.4 Summary / Conclusions

Alternative 1 will result in a continuing increase in stand densities. Vegetation density levels will continue at levels that are not sustainable over time. Increased stand mortality will ensue as will an increased potential for severe wildfire.

Alternatives 2, 3 (Proposed Action), and 4 will all improve stand and forest health and resiliency by removing density induced stress factors. Albeit to different degrees, each alternative will result in distribution, abundance, and species composition for the different vegetation types that more closely approximates the dynamic forest ecosystem existing prior to fire suppression. Untreated areas intermixed with treated areas will maintain landscape diversity and habitats.

All three action alternatives will reduce wildfire hazard at the stand and at broader scales. They will reduce the potential for resource loss due to fire and insects. The amount of reduction is directly correlated to the level of forest health improvement that each of the alternatives will provide. All action alternatives will re-introduce fire into the ecosystem to some degree.

4.5 Resource: Soil / Water

4.5.1 Affected Environment

4.5.1a Soil

Within the river corridor, landforms consist of flood plains, terraces, alluvial fans, and hills. The flood plains are mainly narrow, but broaden out in some areas, particularly between the Applegate River and Robertson Bridge. The terraces are broad, nearly level areas of water-deposited material. The alluvial fans are gently sloping areas at the mouths of the streams and draws. These areas may receive deposits during periods of heavy rains. Low-lying hills adjacent to the river are remnants of larger landscapes that have been eroded.

Soils (USDA 1983) immediately adjacent to the river are deep and well-drained on most flood plains and lower river terraces. Typical soil series found on these landscapes are Newberg, Camas, and Evans. Textures of the soils found immediately adjacent to the river are fine sandy loam, gravelly sandy loam, and loam.

Soils on the higher river terraces and alluvial fans are mainly deep and well drained. Typical soil series found on this landscape are Takilma, Kerby, and Abegg. Textures of the soils found in these areas are cobbly loam, gravelly loam, and loam. Erosion potential for these soils is moderate.

Along the steep, narrow river canyons and mountainous area adjacent to the river, the soils are shallow to deep, well drained, and somewhat excessively well drained. Typical soil series found on this landscape are Speaker, Beekman, and Vermisa. Textures of these soils range from extremely gravelly loam to loam.

The soils of particular concern are the very steep (60 - 100% slope) Vermisa-Beekman, and Vermisa-Rock outcrop. Vermisa is very gravelly and susceptible to downslope movement by gravity and accumulation of gravel on the surface or ravel. This condition is particularly dominant in the Dunn Reach, see Map 6.

Dubakella and Pearsol are steep clayey serpentine soils, usually with spotty vegetation cover due to nutrient limitations (Calcium and Magnesium) and are soils of concern. Also, the granitic Siskiyou soil is very susceptible to erosion. These serpentine and granitic occupy very small areas in the corridor.

BLM's Timber Productivity Capability Classification (TPCC) system mapped some fragile areas within the corridor. These areas occupy small areas that mostly overlap with the very steep soils susceptible to ravel.

4.5.1b Water

Surface water in the corridor is dominated by the Rogue River and its tributaries. Since this is a narrow corridor, the Rogue River is the predominant water feature with short lower sections of tributaries. The larger tributaries are the Applegate River, Jumpoff Joe Creek, Hog Creek, and Galice Creek. All the above streams, except Galice Creek, are water quality limited under the Clean Water Act (303(d) listed).

These 303(d) listed streams are all listed for warmer than standard temperatures for rearing of salmon and trout in the summer. The standard maximum is 64° F. These water temperatures can be attributed to a combination of factors including low summer flows, water withdrawals, wide and shallow channels, stream orientation, geology, and lack of streamside vegetation.

The Rogue River is also 303(d) listed for summer bacteria levels (fecal coliform) and high pH levels in the fall, winter, and spring.

In addition, there are springs and seeps on slopes above streams. Many are used for domestic purposes

including drinking water

4.5.2 Environmental Consequences

Table 4-18 presents summary ratings for different types of soils effects. The indicated degree of change is relative to the current condition.

Table 4-18: Summary of Soil Effects

5th Field Watershed	Term	Type of Effect	No Action No Fire	No Action w/ Fire*	Alt. 2	Alt. 3	Alt. 4
Rogue Rec. Section	Short (1-10 yrs)	Disturbance / Erosion (Direct)	0	Slt.-	Min.-	Min.-	Min.-
		Added Compaction (Direct)	0	Slt.-	Min.-	Min.-	Min.-
		Productivity (Indirect)	0	Slt.-	Min.+	Min.+	Slt.+
		Sedimentation from main skid/ haul roads, spurs, & landings; fire lines/bare soil (Indirect)	0	Mod.-	0	Min.-	Min.-
		Summer Water Temperature (Indirect)	0	Min.-	0	0	0
		Peak Flows (Indirect)	0	Min.-	0	0	Min.-
	Long (10-20+ yrs, Indirect)	Disturbance / Erosion	0	Min.-	0	0	0
		Compaction	0	Slt.-	Min.-	Min.-	Min.-
		Productivity	Min.-	Min.-	0	Min.+	Min.+
		Sedimentation	0	Min.-	0	0	0
		Summer Water Temperature	0	Min.-	0	0	0
		Peak Flows/Yield	0	Min.-	0	0	0

Footnote: Effects ratings - (-) = negative effect; (+) = positive effect; (0) = neutral effect
Min. = minimal; very little, limited to local sites;
Slt. = slight; little distributed over most affected area or moderate level distributed over less than 25% of the project area.
Mod. = moderate levels distributed over >25% or high level distributed over <25% of the project area.
*Assumes fire occurs within 10 years for No Action Alternative. Assume fire covers 75% of project area as modeled (Farsite).

4.5.2(1) Alternative 1 - No Action

As long as wildfire does not occur, the project area will remain in the current condition in the short term. In the long term, soil productivity may diminish, as plants become decadent lacking stimulus to increase growth. As disease and pests thin out vegetation, soil productivity may return to current levels

Approximately 60% of the project area is in a high fire risk/ high fire hazard condition. In the event of a wildfire, approximately 1/3 of the burned area will experience a high intensity / high severity burn. High severity fires burn off most surface litter and duff and will also burn organic matter out of the surface soil. This would eliminate most surface roots. Populations of soil organisms (e.g., micorhizal fungi, bacteria, and insects) would be lost. Soils would be left without: a) organic "glues" that maintain soil structure, b) mechanisms that make nutrients available to plants, and c) root networks that stabilize surface soils. Remaining ash after a fire would provide a quick flush of plant-available nutrients that stimulate sprouts and live seeds to grow. The lost organic and living elements of the soil would, however, have to go through a long term rebuilding to regain pre-fire soil productivity conditions. During this period, a pronounced reduction of soil productivity and potential loss of soil stability would occur. Soil stability loss means a higher susceptibility to erosion or mass movement, especially on steep slopes.

For the No Action Fire scenario, there would also be a potential loss of soil stability in areas of high severity fire. Loss of soil stability is indicative of susceptibility to erosion or mass movement mainly on steep slopes. Stability loss would be due to loss of upper soil structure and loss of root strength from high severity fire burn-out of roots and dead tree root system decay.

4.5.2(2,3,4) Alternatives 2, 3 (Proposed Action), and 4

The following soil and water effects are discussed relative to the no action with fire scenario in Table 3-17 above and are done with the same assumptions.

1) Somewhat reduced for Alternative 2 due to reduced understory spread rate and diminished flame length, though conditions would remain that could create similar effects as for the No Action Alternative modeled fire. Specifically, if the fire were to burn into the crown and spread through crowns in the first day, a lower severity would result in lower potential effects to the soil as it would leave more organic matter and organisms in the upper soil.

2) Moderately reduced for Alternative 3 (Proposed action), especially for the Defense Zone, where up to 12? DBH tree canopies could be removed. The modeled fire, started in the Defense Zone, would less likely spread through the canopy as quickly as for the No Action Alternative, though if it reached the Threat Zone, it could spread through the canopy. The Defense Zone would likely have more low severity and less moderate and high severity burned area and leave soil in the Threat Zone as describe above for Alternative 2.

3) Reduced substantially for Alternative 4, rate of growth would likely be far less because of the combination of understory treatment and large part of the treated area would have overstory treatment. Fire severity would likely be predominately low to none, with some moderate and very little high severity levels.

The table above shows that for all action alternatives, impacts would be minimal or slight. All effects are anticipated to be less than for historical estimated fire return intervals (7 to 20 years). Exposed soil and related disturbance levels and shade to surface water that would exist after any of these treatments would be less than conditions under historical frequency levels.

4.4.3 Cumulative Effects

Cumulative effects for soil and water are measured by indicators of past and foreseeable future treatments within that the watershed. Such treatments include: permanent road building, additions of early seral stage vegetation, % compacted area in the watershed, and shade reduction near streams due to loss of vegetation. There would be no permanent road construction and no additions of early seral stage vegetation. There would be a very small amount of compaction added for each of the action alternatives. This addition would amount to less than 0.01% addition of compacted area to the 5th field watershed, Rogue River/Hellgate watershed. With this addition, the 5th field watershed would remain at moderate levels of compaction, in the estimated range of 5 to 10% compacted area (USDI 1999). The compaction rating should remain fairly constant, as there is very small net additions to them expected for the foreseeable future within the Rogue River/Hellgate watershed.

Concerning 303(d), Water Quality Limited, listing of streams in the 5th Field Watershed, this proposal would have no effect on summer temperatures for the Rogue River, Pickett Creek, and Dutcher Creek. This proposal would also have no effect on pH values and summer fecal coliform counts for the Rogue River. In other words, this project would not add negative effects that would contribute to the water quality limits for 303(d) listed stream in this 5th Field Watershed

4.4.4 Summary / Conclusions

Potential effects to soil and water from the proposed fuel hazard reduction are anticipated to be localized and negligible, for all action alternatives. Erosion would be localized with little if any transfer of sediment to stream channels. There would be some minimal increase in compaction as a result of heavy equipment use, but the extent of compaction would remain at moderate levels. There would be some minimal improvement of soil productivity that would extend through the long term. Water quality levels would remain the same for all 303(d) listed parameters. There would be a minimal water yield increase under Alternative 4 due to reducing overstory density, but no peak flow changes are anticipated. No water yield changes would result from the other action alternatives. There would be no additions to cumulative effects, except a minimal

addition in compaction at the watershed level.

4.6 Resource: Fisheries

4.6.1 Affected Environment

The project area includes approximately 27 miles of the mainstem of the Rogue River and approximately 0.25 miles of every tributary stream. Fish species present in the mainstem and tributaries include: fall and spring Chinook salmon, coho salmon, winter and summer steelhead, cutthroat trout, Pacific lamprey, Klamath small scale sucker, speckled dace, and sculpin species. Coho salmon are federally listed as threatened and Pacific lamprey is a Bureau tracking species in Oregon. Chinook are not federally listed, but are an Oregon Special Status Species.

The Hellgate Recreation Activity Management Plan (RAMP) FEIS (USDI 2003) includes a detailed description of the status of fish populations and the condition of important habitat features in the Rogue. There are 14 main fall Chinook salmon spawning areas in the mainstem of the Rogue. Steelhead trout spawn in at least 11 streams in the project area. Coho salmon spawn in at least eight streams within the project area. The Rogue mainstem provides rearing habitat for Chinook, as well as the fish that are spawned in the tributary streams.

Stream and fisheries conditions in the main tributary streams are discussed in the following watershed analyses: Grave Creek (USDI 1999b), Jumpoff Joe (USDI 1998), Rogue-Recreation Section (USDI 1999), and Murphy (USDI 2000).

The Rogue and several tributaries in the project area are DEQ 303(d) listed as water quality-limited streams based on temperature and other factors. In general, the main tributary streams are characterized as having low large woody debris complexity, shade levels <60% and low levels of mature trees (>32?DBH) within 100' of the streams. Based on these Oregon Department of Fish and Wildlife (ODFW) Habitat Benchmarks, salmon production and survival are limited.

4.6.2 Environmental Consequences

Analysis of the environmental consequences of the alternatives is organized around four major influences on salmonid production and survival: a) sediment, b) channel morphology, c) temperature, and d) large woody debris.

4.6.2(1) Alternative 1 - No Action

The risk of wildfire would remain at current high levels in the riparian reserves. High stand densities in riparian reserves will continue to limit tree growth and thus the future large woody debris (>24?DBH) recruitment pool. Stream shade would continue at current levels and rates of recovery from past disturbance. Salmonid production and survival would continue to be limited by limited large woody debris, the associated low stream complexity, and high summer water temperatures.

Sediment - Fuel loading in the drainages remains high and the risk of high intensity wildfire continues to increase. In the event of such a fire, increased runoff would increase the potential for erosion and sedimentation. Increased sedimentation could decrease salmonid survival in the egg to fry stage. Increased sediment and the resultant turbidity indirectly decreases juvenile salmonids survival due to gill scour and associated mortality from disease.

Channel Morphology - After a high intensity wildfire, at-risk slopes are more likely to fail resulting in debris flows into streams thereby changing channel morphology by filling pools and burying riffles. This would cause a degradation of spawning gravels and loss of pool rearing habitat, with a consequent decrease in the survival of salmonids in the egg, fry, and juvenile stages.

Temperature - A high intensity wildfire would diminish shade with a potential stream temperature increase in drainages with extensive high severity burns. Even a short term temperature increase resulting from a stand replacement fire is likely to have an adverse effect on the currently depressed local salmon populations. Elevated summer temperatures in tributaries and the mainstem adversely affect juvenile salmonids which depend on cool water for rearing.

Large Woody Debris(LWD) - A stand destroying fire in the riparian reserves would further retard the development late-successional forest conditions and would decrease in-stream large woody debris recruitment potential in the long term. Large diameter (>24?DBH) trees adjacent to streams are an important source for instream "key pieces". Key pieces are important for creating habitat complexity for rearing juvenile salmonids and for cover for adults during migration. Large wood is a critical determinant in stream productivity. It affects channel stability, stream hydraulics, pool formation and quality, nutrient and gravel retention, and macro invertebrate diversity. The loss of future recruitment of large trees into streams removes the possibility for recovery of properly functioning large woody debris and decreases the production and survival of salmonid populations dependent on the tributary streams.

4.6.2(2,3,4) Alternatives 2, 3 (Proposed Action), and 4

Salmonid species in the project area are cold water species with complex habitat requirements for each life stage. Coho salmon can be considered an indicator species for the health of the aquatic ecosystems in the project area because, in addition to the habitat requirements of the other salmonids present, they require complex pools and off-channel habitat. The potential impact of the project on coho / coho habitat is addressed in the fisheries biological assessment prepared for this project (Appendix E).

4.6.3 Cumulative Effects

4.6.4 Summary / Conclusions

Based on the fisheries Biological Assessment, any potential effects to fish and aquatic resources from fuel hazard reduction within the riparian reserves are anticipated to be highly localized, negligible, and short term at both the project level (6th and 7th field scales) and at the fifth field scale. Mechanical vegetation treatments and handpile burning in areas outside of the riparian reserves are not anticipated to have any effect.

Prescribed underburning may incidentally cause ash and sediment to enter streams immediately adjacent to a burn. The amount, timing and duration of sediment delivery would be so small and of short duration that it would not kill aquatic insects used as food and would not embed spawning gravels affecting the eggs and alevins. Any ash or sediment that might reach coho or coho critical habitat would be negligible and would not likely disrupt spawning, migration, egg incubation, rearing or feeding and would not cause degradation or modification of habitat. The turbidity would be within the range of natural variability for the streams affected. Further, any sediment would be delivered during the wet season when flows are higher, thereby reducing effects to coho and other salmonids.

Long term increases in canopy cover will contribute to lowering summer water temperatures. Increased recruitment of large woody debris into streams will improve channel complexity and instream habitat. The future recruitment of large woody debris would not be reduced, therefore, having no negative effect on future instream habitat conditions. Improved rearing habitat would increase the survival of juvenile salmonids. Retention of shade on perennial streams will prevent stream temperature increases.

It is anticipated that the long term beneficial effects will maintain downstream salmon production and survival and the environmental conditions will be maintained. The effects to coho or coho critical habitat are not likely to be adverse because of the efforts to eliminate sediment delivery mechanisms, retain shade, and

provide for future LWD recruitment through project design features. Indirect effects from the proposed vegetative and prescribed burning treatments would be beneficial in the long term, as they would reduce the potential for high intensity wildfire in the riparian and upland areas through its alteration of fire behavior.

Endangered Species Act - Based on the Biological Assessment analysis conducted for the proposed action, no adverse effects to coho or coho critical habitat from the proposed fuel hazard reduction treatments are anticipated. The proposed prescribed underburning within the riparian reserves has been determined to be a May Affect, Not Likely to Adversely Affect (NLAA) action for Southern Oregon/Northern California (SONC) coho.

Essential Fish Habitat - The Magnuson-Stevens Act designates Essential Fish Habitat (EFH) for coho and chinook salmon. The Rogue mainstem and the tributaries used by coho are designated as EFH. Actions that have the most potential to produce adverse effects are associated with underburning. The project design features and best management practices adequately mitigate or eliminate the potential adverse effects to EFH.

4.7 Resource: Botany / Special Status Species

4.7.1 Affected Environment

To date, special status species botanical surveys have been conducted on only a portion of the project area. Rare plant species that are known to occur in the project area are noted in Table 3-19. A brief description of these species and typical habitats can be found in the RAMP (USDI 2003).

Gentner's fritillary (*Fritillaria gentneri*), a species listed as endangered under the ESA, is not known to occur in the project area. However, it does occur in oak woodlands similar to those in the project area. The closest known population is within a mile of the Rogue River near the city of Grants Pass with another population area located about six miles from the river in the Picket Creek drainage.

Rogue Canyon rockcress, Rogue River stonecrop, and two moss species (*Funaria muhlenbergii* and *Pseudoleskeella serpentinense*) are found in the rock outcroppings and cliffs in the lower portion of the Hellgate Recreation section. Rogue River stonecrop is the rarest species known to be in the project area. Its entire range is on the serpentine soils of the Rogue River canyon and the slopes above. Rogue Canyon rockcress is also quite rare, but can be found throughout the Klamath-Siskiyou eco-region. It is not limited to serpentine. So far, the *Funaria muhlenbergii* population in the project area is the only known site in the Grants Pass Resource Area. The species is uncommon, but does range north into British Columbia. It is not limited to serpentine soils. *Pseudoleskeela serpentinense* is a moss that is limited to serpentine; hence, its range is limited to the Klamath-Siskiyou eco-region. Siskiyou fritillary also has a range limited to the serpentine soils of the Klamath-Siskiyou eco-region.

Howell's camas has a unique distribution. It is only found on the serpentine in the vicinity of Grants Pass and the Rogue River, but not further south in the eco-region. It can grow in serpentine grasslands or savannahs where vegetation cover, such as grasses, is higher. Similarly, Howell's microseris can be found especially in serpentine savannah, but this species does range further south in the Klamath-Siskiyou eco-region.

Chaparral species along the Rogue River occur in serpentine and are also encroaching onto oak woodlands. Ponderosa or Jeffrey pine, manzanita, and buckbrush are habitat for two lichen species, *Bryoria tortuosa* and *Sulcaria badia*. *B. tortuosa* is the more common of the two species. Both species appear to have their source populations in the crowns of pines, with propagules scattered among the shrub layer. Brushfields with these species are deteriorating in the project area due to lack of natural fire.

Clustered lady's-slipper (*Cypripedium fasiculatum*) is found in the more mature mixed evergreen forest on northerly facing slopes with moist microsite conditions. This orchid ranges north and into Idaho, but has never been a common component of northwestern forests. Its population numbers are quite small when found. It is a long-lived species that can remain dormant for up to 15 years after germination.

Western necklacepod grows in openings in serpentine-influenced forests. This species is quite rare, but its few populations can be extensive near the Rogue River in the vicinity of Galice Creek, along Pickett Creek, and on a small piece of the Kalmiopsis wilderness. This species will move into openings created by disturbance, such as skid trails. Stipuled trefoil is a similar species that prefers openings either created naturally or by human disturbance. Red larkspur is also found just downstream of Galice Creek and could be present in the project area.

Noxious weeds - Disturbed areas of the project area have been invaded by purple loosestrife, Himalayan blackberry, teasel, common tansy, campion, poison hemlock, burdock, hedgehog dogtail grass and such agricultural plants as hops and fruit trees. Only purple loosestrife and Himalayan blackberry are officially listed as noxious weeds by the State of Oregon. Biological control efforts (release of insects) for purple

loosestrife have been occurring over the past several years.

Table 4-19: Rare Plants known to Occur in the Project Area			
Species	BLM/NWFP Status	Global Ranking	Habitat
Arabis modesta Rogue Canyon rockcress	BA/none	G2QS2	rock outcrops
Bryoria tortuosa Yellow twist horsehair lichen	none/S&M D	None	oaks, pines, chaparral
Camassia howellii Howell's camas	BS/none	G2S2	rocky serpentine
Cypripedium fasciculatum Clustered ladyslipper	BS/S&M C	G3G4S2	moist mixed evergreen forest
Delphinium nudicaule Red larkspur	BA/none	G4S2	openings in oak, pine woodlands; chaparral
Fritillaria gentneri Gentner's fritillary	FE/none	G1S1	openings in oak, pine woodlands; chaparral
Fritillaria glauca Siskiyou fritillary	BA/none	G4S2	rocky serpentine
Funaria muhlenbergii Muhlenberg's funaria moss	BA/none	G4S1	rock outcrops, cliffs
Lotus stipularis Stipuled trefoil	BA/none	G5S2	forest, chaparral openings
Microseris howellii Howell's microseris	ST/none	G3S3	serpentine savannah
Pseudoleskeella serpentinense Serpentine moss	BS/none	G2S2	serpentine outcrops
Sedum moranii Rogue River stonecrop	BS/none	G1S1	serpentine outcrops
Sophora leacheana Western necklacepod	BS/none	G2S2	openings in forests w/ serpentine influence
Sulcaria badia Grooved horsehair lichen	BS/none	G2S2	oaks, pines, chaparral

4.7.2 Environmental Consequences

The analysis presented here is based on an estimate of treatments acreage in different plant series. Treatment zones are linked to different treatment prescriptions and plant series can be linked to varying degrees of susceptibility for noxious weed invasion. The botanical protection project design features were developed to preclude substantive impacts to these species / sites. Site specific mitigation strategies would be instituted as needed during the preparation of the neighborhood plans.

4.7.2(1) Alternative 1 - No Action

The No Action Alternative will impact special status and survey and manage species differently, some species will flourish while others will decline in response to general habitat successional trends and the occurrence and intensity of wildfire.

As the current fuel hazard remains high or increases, the potential for a high intensity wildfire increases. High intensity fire could damage underground or above ground plant structures leading to mortality of individuals. This could, in turn, affect the viability of individual occurrences or populations. High intensity fire could threaten dormant *Cypripedium*. The species has been shown not to survive such fires (Mgmt. Recommendations 1998). *Fritillaria gentneri* could be similarly affected. Special status or Survey and Manage lichen species growing in the shrub or forest canopy could be threatened by the high flame lengths that occur in fire condition class 2 and 3 areas.

4.7.2(2, 3, 4) Alternatives 2, 3 (Proposed Action), and 4

The CARs, WUI areas, and the Defense zones will be treated under the same prescriptions. They encompass approximately 62% of the project area. In the Dunn reach, a majority of vegetation in this area is in the 11 – 21?DBH size class. In the Applegate Reach, this size class is prevalent, but hardwoods (mostly riparian species and white oak) are the dominant vegetation, especially within the CARs.

Multiple entries are required for all alternatives. The primary variables determining potential impacts are: the maximum treatment level per entry, the DBH range to be treated, and the size of canopy openings created. Since ultimately, the long term reduction in canopy could go as low as 30% for ponderosa pine stands and 40% for Douglas-fir stands, the greatest effects will be related to native species and their habitats in general, rather than individual special status species occurrences.

Potential impacts common to all three action alternatives include:

a) Each alternative would improve habitat for native plants in general. The degree would vary. In each, natural openings that are being encroached upon by competing vegetation or noxious weeds would be treated. This could lead to increased plant species diversity and the rejuvenation of some currently senescent habitats.

b*) ESA listed species* - If *Fritillaria gentneri* is found not to occur in the project area, there should be no effect to the species. If populations are found, fuels treatments are not likely to adversely affect the species due to the project design features.

c) *Special status and S&M species* - The botanical PDFs should preclude short term, direct effects to special status species. They should also maintain species diversity, as fuels will be treated in a manner that will create a mosaic across the landscape. Long term effects would be similar for all alternatives as they are primarily related to the use of heavy equipment. Direct effects from heavy equipment (e.g., slashbuster) would be soil surface disturbance and removal of native species. Noxious weeds brought in on equipment or moved around by equipment would be an indirect long term effect as theses species are more apt to invade disturbed soils and to out-compete native species in these areas.

d) *Noxious weeds* - The entire project area has a moderate to high probability of noxious weed invasion. Linear weed dispersal corridors, such as roads, are common in the project area. The river itself is also a corridor of dispersal due to flooding or movement of weed seed by recreationists. Plant series within the project area that have a high probability of weeds are drier Douglas-fir series and white oak series. These comprise about 40% of the project area. These plant series, where found in the WUI, CARs and Threat Zones, represent the highest probability areas. The remainder has a moderate probability for weed invasions. Such invasions may not be noticeable at first and will be difficult to detect as multiple entries occur.

d) One species, *Sophora leachiana*, could benefit from project related soil disturbance. This species thrives in disturbed openings where forest treatments have replaced natural disturbance events. Its occurrence within the project area is very limited (three known populations in the vicinity of Rand).

e) Where burn piles are located, soils are apt to be heavily scorched. These scorched areas across the landscape could impede mychorrhiza connections and could again promote invasion of noxious weeds.

4.7.2(2) Alternative 2

This alternative would produce the least amount of direct, short term effects on a spatial (acreage) basis. Each entry would result in the least amount of canopy treatment at the smallest diameter, plus no treatment in the General Forest Zone. The least per entry ground disturbance would occur across the project area. There would be a consequent lower potential for noxious weed invasions.

Temporally, long term effects in seen areas could be compounded by the need for more (at least 3) treatment entries than for the other alternatives. The same ground would be disturbed repeatedly rendering the 2-3 year VRM recovery period moot from a botanical perspective. The potential for weed invasion would be greater. Native grass seed restoration will only be effective is done after the final entry.

In the seldom seen areas, there would be fewer entries and the potential for noxious weed invasion would consequently be less.

Because this alternative has the least amount of treatment prescribed per entry, botanical resources could be affected the most by the continued potential for a severe wildfire. With less treatment per entry, surface fuels and ladder fuels may still exist to the extent that an independent crown fire could occur. This would adversely impact lichen diversity in tree crowns. An intense surface fire could be detrimental to plants on the surface.

4.7.2(3) Alternative 3 (Proposed Action)

Spatially, this alternative would potentially disturb more acreage because the General Forest Zone will be treated. The slight increase in the DBH treatment range would probably not appreciably change the effects from those of Alternative 2, because the same type of equipment would be used under both alternatives.

Temporally, this alternative would not have appreciably different effects than Alternative 2, because the level of disturbance per entry is essentially the same. The same number of entries would most likely take place.

Potential effects related to the continued risk of a severe wildfire are similar to Alternative 2.

4.7.2(4) Alternative 4

This alternative would have the greatest potential impact on botanical resources; it would result in the largest acreage disturbed and has the most potential for habitat alteration. The potential for noxious weed invasion would be the highest of the three alternatives. Large tree removal could reduce shading and moist microsite occurrences more than Alternatives 2 or 3. Species favoring this set of conditions would be replaced by others more tolerant. As larger trees tend to be substrate for a higher diversity of lichen species than do younger trees, large tree removal could contribute to a reduction in localized non-vascular plant species diversity.

This alternative reduces the fuel hazard the greatest. Consequently, botanical resources could benefit the most due to the greatest drop in wildfire potential and intensity. A wildfire in the area would be of much lower intensity and would be more apt to burn in a mosaic pattern across the landscape and to be within the range of historic surface fires.

4.7.3 Cumulative Effects

Reasonably foreseeable actions within the watershed include continued timber harvest outside of the corridor, hazard fuel reduction treatments, and clearing of forest land for development. Special status plant populations will continue to receive protective measures on BLM land, but would be unprotected on other ownerships. In the long term, this could result in a decrease in the ability of populations to expand from islands of undisturbed sties into surrounding altered habitat. Individual populations of special status species would be vulnerable to extirpation from the local sites. (*Sophora leachiana* excepted as it requires disturbance to expand). Fuel reduction treatments should reduce the risk of extirpation due to intense wildfire.

4.7.4 Summary / Conclusions

None of the action alternatives are likely to adversely affect the federally listed, *Fritillaria gentneri*. If populations are located, the project design features should adequately protect them. The PDFs should also alleviate any short term, direct effects to other special status species. The project design features will maintain species diversity across the landscape and the vegetation / fuel treatments purposely retain a vegetative mosaic across the landscape.

The entire project area has a moderate to high probability of noxious weed invasion. Plant series within the project area that have a high probability of weeds are the drier Douglas-fir series and the white oak series. These comprise about 40% of the project area. These plant series, where found in the WUI, CARs and in the Threat Zones, represent the highest probability areas. Such invasions may not be noticeable at first and will be difficult to detect as multiple entries occur.

Alternative 2 would produce the least amount of direct, short term effects on an acreage basis. Temporally, however, long term effects of treatments in the seen areas could be compounded by the necessitated staging of entries (estimated to be at least three). Because this alternative has the least amount of treatment prescribed per entry, botanical resources could be affected the most by the high wildfire potential Alternative 3 (Proposed Action) would result in more acreage disturbed because the General Forest Zone will be treated. Alternative 4 would potentially have the greatest impact on botanical resources because it treats the largest acreage and has the greatest potential for habitat alteration. This alternative creates the highest potential for noxious weed invasion. Additionally, removal of larger trees could reduce shading and moist microsite occurrences more than the other alternatives.

4.8 Resource: Wildlife - Special Status / S&M species and Their Habitats

4.8.1 Affected Environment

4.8.1a Threatened or Endangered Species

Two ESA listed (threatened) species are known in the project area: bald eagle and the northern spotted owl. There is also potential habitat for the marbled murrelet and the vernal pool fairy shrimp. There are no wildlife Federal Candidate Species known to be present.

Bald eagle (*Haliaeetus leucocephalus)* - There are currently (2002) three active nest sites that may be influenced by project activities. Two are within the designated corridor and the third is ¼ - ½ mile from the river.

Northern spotted owl (*Strix occidentalis caurina)* - There are no known spotted owl nest sites in the corridor. However, spotted owls are a wide-ranging species and undoubtedly utilize the corridor for foraging, roosting, and dispersal. Spotted owl Designated Critical Habitat is on both sides of the river downstream from Galice. There are also eight established 100-acre core areas in the 5th field watershed, though no activity centers are within the corridor.

Marbled Murrelets (*Brachyramphus perdix)* are small sea birds that nest in large old-growth trees. Surveys have been conducted and none have been detected on the Medford District. There is a very low likelihood of them nesting in the project area or of them being impacted by the project and no special measures are required (*Rogue River/South Coast Biological Assessment* (USDA and USDI 1996).

Vernal pool fairy shrimp (*Branchinecta lynchi*) are small invertebrates that breed and live in small vernal pools. There are vernal pool fairy shrimp south of the project area on the Whetstone Savanna Preserve and the Abate Desert Preserve. While the project area is north of the currently identified range of the species, potential habitat exists.

4.8.1b Special Status Species

The peregrine falcon (*Falco peregrinus*) was previously listed as federally endangered. While delisted on August 25, 1999, they remain a state threatened and BLM sensitive species. Peregrine falcons nest on large rock outcrops and cliffs and most of the suitable nesting habitat is located downstream of Argo Riffle. There are no known nest sites in the project area, however, there is one downstream in the river's wild section.

Osprey (*Pandion haliaetus*) - There are 30 known osprey nest sites within the project area. Occupancy varies annually. Twenty-two of the sites were occupied in 2002. A high density of sites is located in the southern 1/3 of the project area near Finley Bend. A smaller concentration is located near Indian Mary Park.

There are nine known great blue heron (*Ardea herodias*) rookeries within the project area. This species is identified for nest site protection (USDI 1995). Nesting occurs in deciduous and coniferous trees usually close to water. Rookeries can vary from two to more than 100 nests.

The great gray owl (*Strix nebulosa*) is associated with mature forests with open meadows nearby for foraging. There is little suitable nesting habitat within the project area. However, there is suitable habitat in surrounding forests and suitable foraging habitat within the project area.

The tailed frog (*Ascaphus truei)* and Southern torrent salamander (*Rhyacotriton variegatus)* both occur in steep, rocky, cold water streams within mature forests.

Townsend's big-eared bats (*Corynorhinus townsendii)* roost and reproduce in caves, mines, and large open spaces in buildings (e.g., barns or attics). These roost sites are required for winter hibernation and summer maternity colonies. Townsend's big-eared bats often form large colonies at their roost sites and are particularly vulnerable to disturbance. They are extremely sensitive and will abandon roosts if disturbance becomes excessive. Several abandoned mine adits are located in the project area; one of which is a summer roost for several bat species, including the Townsend's big-eared bat.

The following bat species are also special status species that may occur in the project area: long-legged myotis (*Myotis volans),* long-eared myotis (*M. evotis),* fringed myotis (*M. thysanodes)*, Yuma myotis (*M. yumanensis), s*ilver-haired bat (*Lasionecterus noctivagans),* and pallid bat (*Antrozous pallidus)*. The presence of the Yuma myotis and big brown bat (*Eptesicus fuscus)* has been confirmed. These bat species roost in a variety of habitats (*e.g*., caves, mines, buildings, tree cavities, tree foliage, loose bark, cracks, and crevices) in the project area. If present, all of these species may use the river for water and foraging.

Western pond turtles (*Clemmys marmorata)* inhabit the slow or slack water areas of the river and are relatively common. These turtles lay their eggs in early summer (June – July) on sunny south slopes in clay soils 10 - 70 meters from water (Holland 1991). Young turtles hatch and may winter in the nest, emerging the following spring to migrate back to water. There are seven areas within the project area where pond turtles are known to occur.

Populations of northern sagebrush lizards (*Sceloporus graciosus graciosus*) west of the Cascades are disjunct and widely scattered. Small populations exist in areas of serpentine soils and its associated vegetation in the project area. Their habitat appears to be self-sustaining.

The foothill yellow-legged frog (*Rana boylii)* is often found in the smaller side streams with perennial flows of clear, cold water or in pools that have a connection to the main flow of the stream. These frogs are sensitive to water quality problems, such as increased water temperature and siltation. Road building, mining, timber harvest, and increased ultra-violet radiation have contributed to population declines. They are known to occur in the project area.

Del Norte salamanders (*Plethodon elongatus*) live in talus slopes under closed canopy forests. They are lungless and transpire through their skin, which makes them very sensitive to temperature and humidity changes. This species is commonly found in areas of deep talus that allows them to migrate up and down as weather conditions change. Rocky canyon areas below Hellgate Canyon have an abundance of suitable habitat, although it has not been surveyed for the species. The species has been seen in the project area.

4.8.1c Other Species

Gallinaceous Birds - As a result of population declines in the eastern portion of its range, the mountain quail (*Oreortyx pictus*) is a special status species, although it is a locally abundant game bird. These birds prefer brush fields, a habitat that is widespread in the project area.

Passerine Birds - Western blue birds (*Sialia mexicana*) are secondary cavity nesters and forage primarily over meadows. They nest in cavities created by woodpeckers. Nesting and foraging habitats have declined, as has the species, due to logging, fire suppression, and residential development. Several natural meadows and many old agricultural fields provide habitat in the HRA.

Woodpeckers - The pileated woodpecker (*Dryocopus pileatus)*, Lewis woodpecker (*Melanerpes lewis)*, acorn woodpecker (*M. formicivorus)*, and the white-headed woodpecker (*Picoides albolarvatus)* are all dependent on trees with some level of heartwood decay for the construction of cavities for nesting and roosting. Habitat loss as a result of logging has led to a decline in the populations of the white-headed and pileated woodpeckers. The oak woodland areas that are the primary habitat of the acorn woodpecker and Lewis

woodpeckers have in large part been replaced by residential and agricultural developments or are being encroached on by other vegetation. The white-headed woodpecker depends on large pines. The lower elevation areas in the project area provide oak woodland and pine habitat and the riparian areas provide cavity nesting opportunities.

Neotropical birds are not, as a class, special status species. They are addressed here due to widespread concern regarding downward population trends, habitat declines, the BLM's efforts to comply with Executive Order 13186, the Migratory Bird Treaty Act (per a MOU between the BLM, U.S. Forest Service and the U.S. Fish and Wildlife Service), and the presence of the MAPS station in the project area. In 1995, a Monitoring Avian Production and Survivorship (MAPS) station and a fall migratory banding station were established in the riparian habitat adjacent in the project area. Data collected here shows a high species diversity in the Applegate Reach. BLM land and BLM held scenic easements have protected important neotropical habitats and the migratory flyway.

4.8.1d Wildlife Habitat

Wildlife habitats in the project area reflect the different landforms of the Applegate and Dunn reaches and the different vegetation types. Robertson Bridge to Hellgate is the transition point from the flat alluvial plain of the upper river agricultural environment to the lower river's steep canyon walls and more native environment. Changes in wildlife are evident between the two reaches. Heron rookeries and black bear, associated with the more natural, undisturbed habitats, are more likely to occur below Robertson Bridge.

The Applegate Reach is a broad flood plain that was extensively used for agriculture prior to the BLM's land and scenic easement acquisitions after the Rogue was designated as National Wild and Scenic River. Mesic sites are now vegetated with black cottonwood, willow, and blackberries; the drier sites are dominated by ponderosa pine, white oak, and non-native grass. Up-slope habitats are a combination of oak woodlands and conifer forests.

In the Dunn Reach, the narrow river canyon restricts the riparian vegetation to narrow bands immediately adjacent to the river. Most of the habitat in the Dunn Reach consists of steep canyon walls vegetated with Douglas-fir and canyon live oak, which provides habitat for a variety of species (e.g., turkey vultures, ringtails, cliff swallows, black-tailed deer, black bear, osprey, bald eagles, and spotted owls).

4.8.2 Environmental Consequences of the Alternatives

Approximately 45% of the project area lies within the Communities-At-Risk designation. Approximately 17% lies within the Defense zone, 25% within the Threat zone, and 13% in the General Forest zone. Since the Communities-At-Risk and the Defense zone will be treated under the same prescriptions, their combined acreage is 62% of the project area. Within these combined areas in the Dunn Reach, the majority of forest vegetation is in the 11 – 21" DBH size range with a large secondary component of hardwoods including riparian species and canyon live oak. In the Applegate Reach, this size class is also prevalent although hardwoods (mostly riparian species and white oak) are the dominant vegetation, with mid-conifers the secondary component.

Reduction in canopy will be the primary effect on species and habitats. Multiple entries are required for all alternatives with the driving variables those of maximum treatment level per entry and size class of vegetation that can be treated. Ultimately, the long term reduction in canopy for all treatments, in all areas, could go as low as 30% for ponderosa pine stands and 40% for Douglas-fir stands. Therefore, long term effects will be similar for all alternatives.

Effects on all species listed in the affected environment were considered in this section. As habitat characteristics are the factors affected by the action, except for threatened or endangered species and particular effects to an individual species, only habitats will be addressed in this section.

4.8.2A Environmental Consequences to Species

4.8.2A.1 Threatened or Endangered Species (See Biological Assessment, Appendix ??)

4.8.2A.1(1) Alternative 1 – No Action

Northern Spotted Owl: Habitat, extent and quality, would remain essentially at its current level. None of the 136 acres of suitable spotted owl nesting habitat within the project area will be degraded. As per the Project Design Features, canopy closure will be maintained at or above 60% in these areas.

Bald Eagles: Habitat extent, and quality, would remain essentially at its current level. Fire risk would remain high within the area.

4.8.2A.1(2,3,4) Alternatives 2, 3 (Proposed Action), and 4

Northern Spotted Owl: There are 3,781 acres of Northern Spotted Owl designated critical habitat (CHU) (CHU #OR-65) in the project area. Of this, 668 acres are within the General Forest Zone including 136 acres of suitable nesting habitat. This is the only suitable nesting habitat within the project area. Alternatives 3 and 4 include treatments in suitable nesting habitat areas but the treatments are limited to not reducing canopy closure below 60%. Its function as nesting habitat should continue and the project would have only non-substantive impacts to northern spotted owls.

CHU located outside of the LSR includes 415 acres of foraging habitat. The proposed actions would reduce the habitat quality to dispersal habitat.

Within both CHU and LSR, as much as 1,630 acres of dispersal habitat could be reduced to 40% canopy cover, the minimum canopy required to be classified as dispersal habitat. Within the Defense and Threat Zones, larger class trees could also be removed under Alternative 4, further degrading late-successional forest characteristics.

Table 4-20: Acres Within Northern Spotted Owl Designated Critical Habitat (CHU) and Overlapping Treatment Zones

	CHU	CHU – Defense Zone	CHU – Threat Zone	CHU – General Forest
Total Acres	3,781	1,071	1,930	663

Table 4-21:. Acres of Spotted Owl Habitat and Changes in Habitat Through Project Treatments under Alternatives 2, 3 and 4

	Pre-project Habitat acres			Post-Project	
Land Designation	**Nesting**	**Foraging**	**Dispersal**	**Nesting**	**Dispersal**
Within CHU Only	0	415	0		415
Within CHU & LSR	136	0	0	136	
Within CHU or LSR	0	0	1,215		1,215
Outside CHU & LSR	0	639	0		639

Bald Eagles: A defensible space may be created around nest and roost trees and potential nest trees within ½ mile of nests. Activities will occur outside of the nesting season. Potential nest and roost trees within this area will be retained. Following the Northwest National Fire Plan, Effects Determination Criteria Instructions, all alternatives will result in minimal effects to the species and likely be a beneficial effect (National Fire Plan 2000; Frank Issacs, personal communication).

4.8.2A.2 Environmental Consequences to Habitats

4.8.2A.2(1) Alternative 1 - No Action

Vegetation and habitats will continue to change to the advantage of some species and the disadvantage of others. The forest maturation process, including development of larger trees and canopy layers, would continue. Existing late-successional forest habitat would continue to provide habitat and dispersal opportunities for late-successional dependent species. Snag and down wood cycling would continue at its current rate. Species utilizing this habitat, such as the pileated woodpecker, would benefit from continued recruitment of snags.

Species that depend upon forest disturbance would continue to decline. Species that require open meadows or oak woodlands will continue to decline as encroachment by conifer and chaparral species continues. Shade intolerant tree species that are highly fire tolerant (*e.g.*, California black oak, Oregon white oak and pines) would continue to be lost from the stand. Stand structure complexity would continue to be simplified by the loss of tree species such as Pacific madrone and California black oak that create horizontal structure. Species utilizing these tree species for mast and berry crops, as well as cavities and nesting structure, would lose habitat.

The extent of early seral forest stands / habitat will continue to decline as they develop on their current successional trajectory. Species, such as elk, that utilize early forest conditions would slowly lose their current level of browse.

Pine, oak, Jeffrey pine savannahs, and serpentine meadows would continue their declining trend for both extent and vitality due to the invasion and encroachment by fire intolerant species. Current trends in habitat change of these plant associations adversely affect wildlife species, such as the western screech owl, western blue bird, and violet green swallow. These bird species prefer white oak and ponderosa pine plant associations for nesting and foraging and some are experiencing population declines.

Riparian areas and associated upland vegetation would continue to develop at their current rates. Areas dominated by early seral vegetation would continue to hinder the dispersal of species associated with older forest, but would provide habitat for species associated with early seral vegetation. Areas with mature forest would provide for quality dispersal habitat for species associated with older forest. Succession would continue at the current rate, which is inhibited in areas of excessive density. The area would continue to provide low elevation older forest conditions that offer refugia for late-successional forest species.

Brush fields, particularly *Ceanothus cuneatus*, would continue to become enclosed and increasingly senescent, providing little in food resources and few gaps for large herbivores to travel through.

Stand development patterns would, however, continue to differ from the patterns of the pre-fire suppression period (*i.e.*, natural disturbance regimes). Fire suppression policies dictate that fire would continue to be largely excluded from the ecosystem. Forest fuel buildups would continue, increasing the wildfire risk to the existing forest habitats.

The actual affects of a potential wildfire are difficult to gauge. Forest habitat can be benefited or degraded by a fire depending on the intensity. A moderate surface fire may benefit late-successional forest by creating gaps in the canopy, encouraging shade intolerant tree species, renewing brush fields, and increasing the forest complexity.

In summary, Alternative 1 would continue the current vegetation and habitat successional trajectories. Stand densities would continue to increase to a point where stagnation and mortality would begin to select out individual trees. Species associated with snags and down wood, such as the woodpeckers, would benefit from the increase in habitat. The risk of stand replacing fire would continue to be high. The probability of a

stand replacing fire would remain high. The affects of a fire would depend on severity. A moderate surface fire may benefit late-successional forest by creating gaps in the canopy, encouraging shade intolerant tree species and increasing the forest complexity. A severe fire may result in loss of habitat, a heterogeneous landscape and possible extirpation of species that depend upon mature forests from the area for an extended period of time.

4.8.2A.2(2) Alternatives 2, 3 (Proposed Action), and 4

Vegetation and associated habitats in all three alternatives will undergo some changes. Treatments should enhance diversity across the landscape and aid in the forest maturation process as trees are "released" due to reduction in competition. Development of larger trees and canopy layers would continue. The Threat and General Forest zones would continue to provide habitat and dispersal opportunities for late-successional dependent species. Snag and down wood cycling would slow, but not cease. Sufficient levels of snags and large trees are expected to continue to benefit species, such as the pileated woodpecker.

Under Alternative 4, late-successional forest habitat would be reduced in the Defense zone because of the larger size class being treated. Diversity in the understory will be reduced, although there will continue to be refugia and dispersal corridors within riparian and other deferred areas.

Species that depend upon forest disturbance would benefit, as would species that require open meadows or oak woodlands as these habitats will be enhanced by reduction of encroachment by conifer and chaparral species. Habitat for shade intolerant tree species that are highly fire tolerant (e.g., California black oak, Oregon white oak and pines) would be enhanced. Stand structure complexity would be enhanced especially on a landscape level, as Pacific madrone and California black oak would be retained. Species utilizing these tree species for mast and berry crops, as well as cavities and nesting structure, would gain habitat.

Meadow, pine stand, and oak woodland enhancement will also benefit species, such as elk, that utilize early forest conditions.

Density of pine, oak, Jeffrey pine savannahs, and serpentine meadows would be reduced, enhancing extent and vitality. Oak snag recruitment may decline, but large oaks will be retained, in turn retaining habitat for western screech owl, western blue bird, and violet green swallow.

Brush fields in all action alternatives may be thinned and burned, restoring senescent brush to a healthier state. While treatments will reduce the overall area of brush, it will increase the edges often preferred by mountain quail and provide for food resources and access by large herbivores.

Stand development patterns would be expected to trend more toward patterns of the pre-fire suppression period (*i.e.*, natural disturbance regimes).

Forest fuel buildups would be decreased, decreasing the wildfire risk to the existing forest habitats. Wildfire should remain on the surface, except in extreme conditions. A more natural range of disturbance may benefit late-successional forest by creating gaps in the canopy, encouraging shade intolerant tree species, and increasing the forest complexity.

Migratory and other land birds: There is a potential for short term, direct impacts to ***breeding land birds*** during the nesting season, though the rate of treatment (1,200-1,600 acres per year) should minimize impacts to reproductive success in any given year. There is also a possibility that reduction in reproductive success may occur in species preferring higher density stands due to displacement or increased competition in nearby intact stands. While acknowledging the potential for negative effects to migratory bird species, slashbuster and other treatment PDFs will maintain structural diversity across the landscape, minimizing species disturbance and reducing shifts in species composition. Focal habitat will be maintained within riparian reserves, and throughout the project area, in adequate patch sizes to maintain species requirements.

Effects to land birds will be highest in the Defense zone as the highest level of treatment is proposed for that area, especially within the understory treatments, with slightly lower effects within the Threat and General Forest zones (in alternatives 3 (Proposed Action), and 4) because of the smaller size class of vegetation being treated in those zones.

As migratory birds utilize riparian corridors extensively, there is a potential in all action alternatives to impact habitat characteristics necessary for successful migration. However, riparian corridors and PDFs that retain and enhance diversity across the landscape should maintain adequate habitat characteristics for species migration.

In summary: Generally, Alternatives 2, 3 (Proposed Action),and 4 would contribute to habitat diversity across the landscape. Stand densities would be decreased as would understory vegetation. In the Defense zone, vegetation structure, especially in the understory, would experience a decrease in diversity. Within the Threat and Defense zones, vegetation structure would be more diverse, enhancing habitat for many species. In Alternative 4, some stands could lose structural diversity and late-successional habitat characteristics. Snag recruitment would decrease because of decreased competition and reduced density dependent mortality. Species associated with snags and down wood, such as woodpeckers, would continue to exist within the project area. The probability of a stand replacing fire would decrease. Wildfire would likely result in relatively small areas being burned, leading to a more heterogeneous landscape and continued existence of species that depend upon mature forests. Riparian areas and associated upland vegetation would be enhanced. Diversity will be retained across the landscape to provide habitat for species associated with early seral vegetation, as well as areas with mature forest to provide for quality dispersal habitat and refugia for species associated with late-successional forest.

4.8.3 Cumulative Effects

The reasonable foreseeable future actions that will take place in the matrix and on county and private lands will include continued timber harvest, understory treatments, and clearing of forest land for development. This project will not result in any additional adverse impact to late-successional forests within the watershed.

While other projects within the Rogue-Recreation Watershed may degrade suitable habitat, refugia and connectivity corridors, the present project itself will have relatively minor effects on species persistence. Though rivers are important migratory routes for many species of land birds, it is anticipated that all alternatives will retain adequate vegetative diversity so as not to affect species dispersal patterns.

4.8.4 Summary / Conclusions

Because of the Project Design Features and the resultant high level of habitat variability expected to remain across the project area and surrounding landscape, impacts on sensitive species will be minimal. Areas untreated because of riparian and Survey & Manage buffers, and buffers instituted around meadows and other features as designed into the project, will serve as refugia and migration corridors for wildlife.

Based on the June 2002 Northwest National Fire Plan Consultation Process (USDA / USDI 2002), activities that conform to accepted practices for Threatened & Endangered species (habitat retention, seasonal restrictions, etc) and other specific project design criteria, effects to Threatened & Endangered species is expected to be non-substantive. The USFWS will be consulted on the effects to the bald eagle following the Northwest National Fire Plan Consultation Process. Guidelines have not been delineated for the northern spotted owl or the marbled murrelet through this process, so the standard consultation process will be followed for these species.

4.10 Resource: Roads, Transportation, Infrastructure

4.10.1 Affected Environment

Roads - The primary transportation system in the project area consists of state highways (2.1miles), county road (12.9 miles), BLM roads (13.0 miles), and private roads (19.7 miles). Most of these roads have a long history of log hauling and recreational use.

Back Country Byway recreation traffic follows the river through the project area (Galice-Hellgate Back Country Byway, Grave Creek to Marial Byway). Road traffic is typically light to moderate November through April, consisting mainly of residential and some recreational traffic. Moderate to heavy use occurs May through October, particularly on the weekends, with a large increase in recreational traffic. Congestion is heavy on the Merlin-Galice Road in the Galice Resort area from June through September.

Road access for fire suppression work or for fuel reduction treatment work is limited in some areas, particularly in the east side of the lower section of the Dunn Reach.

Road maintenance programs typically include roadside brushing for driving safety, although standards vary. Roadside brushing / clearing to provide safe ingress and egress for emergency services / fire fighting equipment occurs to a much lesser extent. Many roads and driveways do not currently meet fire-safe standards.

4.10.2 Environmental Consequences

4.10.2(1) Alternative 1 - No Action

Under the No Action Alternative, roads would remain in their current conditions. Emergency ingress and egress access routes could remain unidentified and irregularly maintained for wildfire suppression safety. In the event of a high severity fire, the loss of soil stability and potential for mass movement on steep slopes would put portions of the infrastructure at increased risk of loss or failure.

4.10.2(2,3,4) Alternatives 2, 3 (Proposed Action), and 4

The transportation system would not be adversely affected. Some local traffic would increase during project implementation. There would be no substantive adverse impacts foreseen or the impacts would be beneficial for the planned activities. Road maintenance activities may have short term site-specific minimal erosion and sedimentation yield, but in the long term would decrease the current amount of erosion and sedimentation yield. Alternative 2 would produce the least amount of short term impacts. Under Alternative 3 and 4, the truck traffic would increase due to hauling and dispose of bio-mass material. Roadside brushing and clearing with a fire-safe objective would improve.

4.10.3 Cumulative Effects

With no additional roads constructed and only minor short term increases in vehicular traffic attributable to the proposed action, the project would not contribute to cumulative effects.

4.10.4 Summary / Conclusions

See discussion above (4.10.2(2,3,4))

4.11. Air Quality

4.11.1. Affected Environment

The RAMP (p. 3-5) provides an overview of air resources in the project area.

4.11.2 Environmental Consequences

The principal impact to air quality is expected to be the temporary visibility impairment caused by smoke from wildland and prescribed fires. Potential short duration and long duration (single day to several weeks), high level PM 10 and PM 2.5 emissions would be expected from major wildfire events within the local area or region. Prescribed burning emissions would not be expected to exceed standards. If standards are exceeded, they would most likely be highly localized and several hours in duration.

Wildfires have the potential to emit large quantities of smoke over long periods of time and at uncontrollable times. Whereas prescribed fire will produce smoke, through appropriate smoke management measures, the quantities, duration, and timing of the burn can be adjusted to manage such production.

Alternative 1 would have the lowest level of smoke from prescribed burning activities, yet have the greatest potential for large scale smoke events from wildfires.

Alternatives 2, 3 and 4 would have similar effects with high amounts of smoke produced from prescribed burning, yet over time, lower levels resulting from wildfire events. Because burning would be done within the Oregon Smoke Management plan requirements, state air quality standards would be met.

4.11.3 Cumulative Effects

Oregon Smoke Management requirements and state air quality management work to keep cumulative effects of smoke within acceptable standards.

4.11.4 Summary / Conclusions

See discussion above – 4.11.2

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